

CW SAMPLE COPY
MI48103UIVYUWVIM FCWB FC
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48103

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

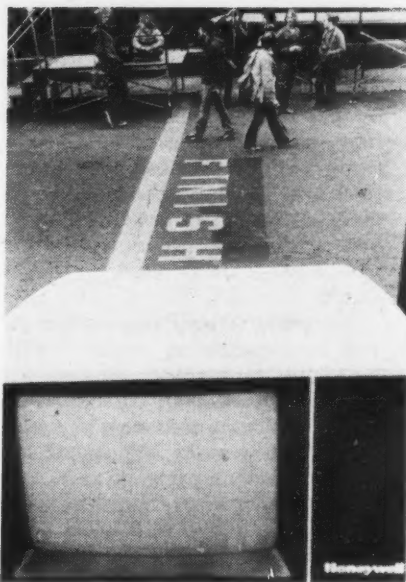
April 24, 1978

75¢ a copy; \$18/year



CW Photos by A. Dooley

Long before Bill Rodgers arrived, a mini-computer was waiting at the finish line to record his winning time in last week's Boston Marathon. The system gave almost immediate information on the first hundred runners to finish the grueling, 26-mile, 385-yard race. See story on Page 4.



Government Monopoly Feared Fed Bucking Justice With EFT Plan

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Board of Governors of the Federal Reserve System last week moved forward with plans to create a nationwide network for making payments electronically

Justice Decides Not to Request IBM Relief Now

By E. Drake Lundell Jr.

CW Staff

WASHINGTON, D.C. — After several months of soul-searching, the Department of Justice has decided against asking for interim relief in its massive antitrust case against IBM.

The decision was made, according to Antitrust Division chief John H. Shenefield, because such a motion would ultimately delay the case, which was filed more than nine years ago and has been in active trial stages for almost three years.

(Continued on Page 4)

rather than by check — despite opposition from the Justice Department.

The Department of Justice called the Federal Reserve proposal, which would employ telecommunications facilities to tie together the nation's regional automated clearinghouses (ACH) and increase the speed of the electronic funds transfer (EFT) systems, "an unwarranted intrusion into an area of developing technology that should be left to the private sector."

Similar objections have been made by the Justice Department to proposals that the U.S. Postal Service venture into the field of electronic mail [CW, Feb. 27]. In both cases, the department's Antitrust Division fears a government monopoly will cut short the growth of a promising technology.

While the Federal Reserve met resistance to its EFT network plan, the board won the Justice Department's approval to lend its services to facilitate the transfer of funds among Federal Reserve banks over a privately operated wire network known as Bankwire.

Assistant Attorney General John H. Shenefield said the Antitrust Division

favors the Federal Reserve's support of Bankwire, a communications network owned by an association of banks, "because it promises to stimulate the development of funds transfer and clearing services by the private sector."

(Continued on Page 6)

Shop Floor Terminals Ease Production for Truck Maker

By Howard A. Karten

CW Staff

SALT LAKE CITY, Utah — "Occasionally, I wrap a tissue around one of the plastic badges and insert it in a [data collection] terminal to clean it."

That's the full extent of the preventive maintenance Steve Stephens, assistant controller of the Williamsen Truck Equipment Corp., does on the shop floor terminals used here to keep track of his firm's custom truck body manufacturing operation.

Despite the fact that the data collection devices operate in a dusty, greasy environment, they are highly reliable

spring of 1977.

The global machine provides load balancing which can be used to "bias the system" when certain I/O facilities are available, so the loosely coupled configuration operates more efficiently than separate systems, Rivera said.

One 158, One 470

At Massachusetts Mutual Insurance Co. in Springfield, Mass., an IBM 370/158 is operating with an Amdahl 470V/6 under MVT. The 158, with a full implementation of ASP, acts as the global machine.

The loose coupling means job turnaround is better "and you don't have to manually decide when a job runs," according to Robert Bologna, director of the DP center. Jobs are submitted either from a card reader or from remote job entry terminals and the configuration makes it possible to access specific files faster, he said.

The 470 runs an on-line application processing life insurance claims plus IBM's Time Sharing Option and batch applications; the 158 runs an interactive APL application. Regardless of the individual tasks, the coupling provides a single systems image, Bologna said.

"If you were manually scheduling the work on one processor and also on the other, one of the systems might be saturated and the other might have spare capacity. With loose coupling, the resources can be assigned by the global machine as they become available," he pointed out.

Massachusetts Mutual has a second 470V/6 scheduled to come in next year. When that happens, the 158 will stay to form a triplex configuration. At first the three CPUs will remain under SVS ASP, but some thought is being given to going to MVS with JES3, Bologna said.

(Continued on Page 6)

and get virtually no other maintenance, Stephens said. Since the system was installed last July, it has gone

'Source Data Entry: Getting the Job Done,' a CW Special Report, follows Page 50.

down "perhaps once every two weeks, on the average, for maybe two or three minutes," he said.

Those failures have been caused primarily by the buffers on the terminals filling too fast. When that happens, no

(Continued on Page 4)



TM reg. U.S. Pat. Off.

EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Assistant Editor	Frank Vaughan
Washington Bureau/Chief	Edith Holmes
Staff Writers	Catherine Arnt Jeffrey Beeler Marcia Blumenthal Howard Karten Timothy J. Scannell Brad Schultz Marguerite Zientara
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara T. VanScoyoc Susan Gerrard Joe Hunn
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone

SALES

Vice-President	Roy Einreinhofer
Advertising Administrator	Terry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen

CIRCULATION

Vice-President	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep Assistant	Peggy Kelly Eleanor Smith

PRODUCTION

Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: Washington, D.C.: 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718. **England:** Roger Frampton, Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. **W. Germany:** Hans-Jurgen Ballnath, Computerworld, c/o Computerwoche GmbH, 8000 Munchen 40, Tristansstrasse 11. Phone: 36-40-36/37. Telex: 5215350. **Asia:** Hidetsuna Sasaki, Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S. — \$18 a year; Canada and PUAS — \$28 a year; Europe and Near East — \$75 a year; all other foreign — \$125 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160.

Specialized DP Services Soon to Outpace Hardware, Communications Costs: Lotz

By Nancy French
CW Staff

ATLANTA — In the near future, hardware will be free, communications will be almost free and the user will be spending a major percentage of his DP budget on specialized services, Jack Lotz, president of Computerized Automotive Reporting Service, Inc. predicted here last week.

Speaking at an Expo '78 user forum on future computer resources, Lotz cited IBM's proposed Satellite Business Systems (SBS) as evidence of a new phase of DP history during which vendors will make the major portion of their profits from services.

Expo attendees who only moments before had struggled with questions involved with implementing a data base management system were treated to a view of a day when they could have \$5,000 rooftop earth stations able to send or receive data from other company sites by satellite at speeds that will make today's DP and communications hardware obsolete.

Quoting IBM's SBS proposal to the FCC, Lotz said SBS will offer low-speed transmission rates to 19,200 bit/sec, medium-speed rates to 896,000 bit/sec and high-speed transmission rates to 6,212,000 bit/sec.

High-Speed Processors

To accommodate such high-speed transmissions, new high-speed processors will be needed, he predicted. IBM will fill that requirement with CPUs that are far larger than anything in use today, he said.

A system 80 with no relationship at all to the existing 360/370 line of processors will be introduced for use in conjunction with services available through the corporation's SBS subsidiary, he predicted.

"SBS threatens the very life of

AT&T," Lotz said, predicting that AT&T will soon make a major computer-type announcement. It won't call it computing but it will be a computing rather than a communications



Jack Lotz

CW Photo by T. Scannell

product, he said.

After all, AT&T did not hire Archie McGill, formerly an IBM marketing guru, for nothing, he indicated.

In the new world Lotz described, software development costs will continue to skyrocket, but users will avoid those costs by purchasing services from vendors whose development costs will be spread over many hundreds of users, he said. Along with new services and processors will come new mass storage devices, he predicted.

"By 1985, reliable sources tell us, it will be possible to obtain 1 billion bytes of high-speed random-access storage for \$40,000," thanks to electron beam addressed memory (Ebam) or bubble memory — both of which have no moving parts, he said.

When this occurs, it will be cheaper to retrieve information electronically than on paper. Even though some users have so far resisted microfilm

and microfiche, the future cost savings will break down their resistance to change, he predicted.

Crediting an E.F. Hutton analyst with his next idea, Lotz predicted that IBM will break itself into five companies much like General Motors. These will include a larger computer manufacturing firm; an office systems division, which will be a meld of the general systems and office products divisions; a plug-compatible peripherals company; SBS, the proposed communications firm; and a finance company to finance DP sales.

That this world is coming closer every day is at least partially borne out by the recent entry of National CSS, Inc. into the systems business as a vehicle for selling services, he pointed out [CW, April 17].

He also mentioned that Amdahl Corp. has taken a step forward with remote diagnostics of its CPUs under a system called Amdac.

Noting that IBM never got its promised remote diagnostics system off the ground, Lotz described Amdac as employing a Data General Corp. mini-computer tied into the console of its installed systems. The mini scans each of the processor's 16,000 self-correcting circuits and records when a component fails. That information can then be accessed by maintenance engineers, he said.

Lotz finally mentioned the introduction and pricing of IBM's new 3033 multiprocessor system as an example of the firm's need to "keep competition going for our own good as users."

IBM uses functional pricing rather than prices based on the cost of manufacturing and selling equipment. As long as nobody else can offer the same equipment, those prices will remain high, he said.

On the Inside This Week

NEWS

Mini Keeps Pace With Country's Oldest Marathon...	4
Federal Control of Data Leading to '1984' World?...	5
Savings Unsafe With EFT Now, Annunzio Charges...	8
Ribicoff DP Crime Bill Called Valuable Weapon...	9
Colloquium Urges MIS Heads to Know Business...	10
... But One Firm Tells Them to Talk Business...	11
DP Snare of Runaway Parents Nets \$1.6 Billion...	12
Agencies Found Lacking Support for Security...	13

EDITORIAL

Fiber Optics...	14
Human Connection: Culture Gap Faces DPers...	15
Taylor Report: Headhunter Situation Dangerous...	15
Battle Between Languages Merely Political...	16

SOFTWARE & SERVICES

IBM 3800 Now Gives Graphs With Reports...	17
'MCS3000' Aids HP-Based Communications...	18
Nucon to Key on Management...	20
Utility and IMS Link Ease Insurer's Operations...	22
Growth in Use of Pascal Called Revolutionary...	24

COMMUNICATIONS

CA Architecture Backs Varied Protocols...	27
Phototypesetter Maker Features Smart Terminal...	28
Mailgram System Provides One-Day Service...	29
Range of Standard Features Marks GE Printers...	30

TERMINAL TRANSACTIONS

HP Terminals Support Manufacturers...	31
Ann Arbor CRT Offers Big Characters...	31

SYSTEMS & PERIPHERALS

Service Bureau Couples Large CPUs...	33
Tandberg Offers Formatter...	34
On-Line Pest Control Firm Kills Paper Bugs...	36
RJE Net Tracks Big Number of Small Parts...	37
Mixed-Media Entry Sews Up Apparel Orders...	38
Hotel's On-Line System Eases Check-In, Billing...	42
Decentralization Reduces Insurer's Entry Costs...	43
Optical Scanner Scores High in School District...	44

MINIWORLD

CM Adds 'High-Performance' George...	51
Xylogics Disk Controller Aimed at PDP-11/03...	52
DEC Expands Memory With Disk Drive Additions...	53
Dual-Density System Fits Univac V77...	54
DG Array Processor Boasts 'Very High Speeds'...	56
Supermarket Mini Gets 25% Off Utility Bills...	58

MICROCOMPUTING

Olivetti Ties Together Micro, Calculator...	61
Motorola Extends Exorcisor Development Unit...	62

COMPUTER INDUSTRY

Mainframers' Nets Hit Quarterly Highs...	63
Battle Against Software Tax Moving Ahead...	63
RCS Firms Reacting to Mini's Inroads: Survey...	64
Tenn. Bill Retains Tax on Commercial Software...	65
Nigeria Seen as Large and 'Dashing' DP Market...	66
Buyers on DP Firms Face Critical Tax Choices...	67
Growth Deterrents Reported in Facsimile Mart...	68

MYSTERY

Why did an IBM staffer ask us to send data on SyncSort?

(Is our large competitor about to become a user?)

Call (201) 568-9700.

We're an equal opportunity sort supplier.

We've always been proud of the many Fortune 500 companies that use SyncSort. But never did we think, even in our wildest dreams, that IBM's name might one day appear on that list. Now, we're not so sure!

The other day, as we were leafing through a stack of reader-reply cards asking for more data about SyncSort, we came across one that caused us to upset our coffee cup in surprise. It read like this—with only the name of the sender withheld to Protect the Innocent:

(Name)

1 IBM Plaza, Chicago, Ill. 60611

Who sent the card and why? Speculation began to run rife through our office, and hypotheses sprang up like dandelions after rain. Here are a few of the more printable:

- **Hypothesis 1:** A new IBM employee, his or her brain muddled by all those Think signs, sent the card by mistake. Only later will he or she learn the truth and gasp in amazement: "You mean we make sorts, too? But...but I thought we were a hardware company!"
- **Hypothesis 2:** Maddened by years of playing second fiddle in sorting, IBM has created a new, high-level Sorting Performance Investigation Team (SPIT) to find out what really makes SyncSort tick. As soon as the data is received and strapped to the operating table, voices will be heard muttering through surgical masks: "Scalpel...suture...somebody count those sponges..."
- **Hypothesis 3:** Deep in the caverns below IBM Plaza, a lonely researcher, doing advanced work on MVS performance, mutters: "If only I had a sort program that didn't chew up so many resources...something like (choke) SyncSort..."

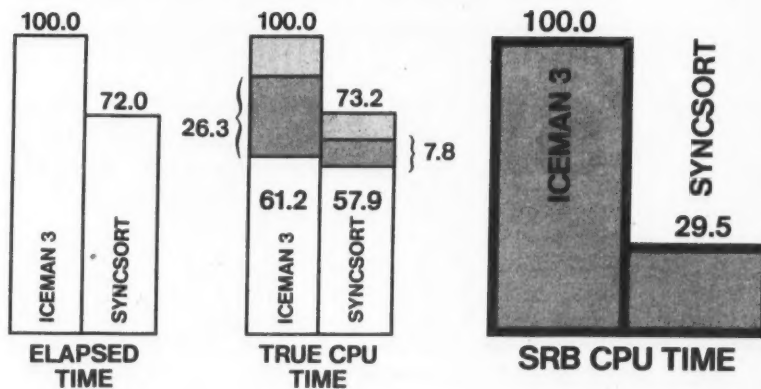
Naturally we hope it was No. 3 who sent off the card. Because we'll be glad to help solve that nagging MVS problem.

We'll begin by explaining that in MVS there are two components of True CPU Time, apart from overhead:

- **TCB Time**, which is interruptible. If the CPU wants to switch signals and run another job, the message gets through.
- **SRB Time**, which is non-interruptible. The line is always busy—and too bad about those other, non-sorting jobs in the mix.

Then we'll display the charts below, which compare SyncSort's overall performance with IBM's own 5740-SM1, Release 3, and pinpoint the considerable difference in "locked-up" SRB Time.

COMPONENTS OF TRUE CPU TIME

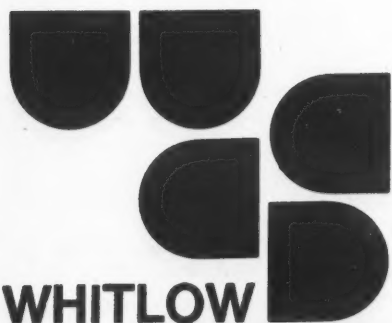


Finally, we'll welcome IBM as the newest SyncSort user—after they've signed the usual non-disclosure statement, of course.

Think of the ramifications of that union: The World's Greatest Hardware Manufacturer and the World's Greatest Sort Manufacturer. Together at last!

OVERSEAS REPRESENTATIVES —

Brussels: CAP/GEMINI Belgium
Dusseldorf: CAP/GEMINI GmbH
Geneva: CAP/GEMINI Switzerland
Hague: CAP-GEMINI/PANDATA
Johannesburg: Computing Benefits Ltd.
London: GEMINI Ltd.
Melbourne: Shell Oil Co. of Australia
Milan: SYNTAX
Paris: CAP/SOGETI PRODUCTS
Stockholm: BRA
Tel Aviv: ADVANCED TECHNOLOGY, Ltd.
Vienna: CAP/GEMINI GmbH



WHITLOW COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Mini Keeps Pace With Marathon Finishers

By Ann Dooley
CW Staff

BOSTON — Although the official timekeepers never made it to the finish line, a Honeywell Information Systems, Inc. minicomputer kept pace with the 5,492 runners who completed the 82nd Boston Athletic Association (BAA) Marathon — the country's oldest — last week.

As each runner finished the race, a Marathon official pushed a button attached to the Level 6/33 minicomputer that recorded the finishing time and provided information on the runner. The button could be pushed up to 30 times a minute and the runners' scores were recorded to the nearest second.

Data on the first 100 runners who completed the race was retrieved almost immediately from the Mini's data base and their names and numbers were called out to the thousands of spectators lined up to watch the end of the race.

The crowds all along the Marathon course were so dense that the official timekeepers, riding along the race route, never made it to the finish line to see William Rodgers of Melrose, Mass. — or any of the runners — complete the course. Rodgers ran the 26 miles and 385 yards in 2:10:13 to become the second American to win the Marathon twice.

Runner's Data Base

Once the first 100 runners had passed the minicomputer located at the finish line a different procedure took over, the runners' numbers were collected at a check station as they finished and listed with their finishing times.

Numbers and times were then entered into one of six terminals located at the nearby Prudential Insurance Co. building and the data was sent over telephone lines to a Multics system at HIS facilities in Billerica, Mass., where more complete information had been stored prior to the race.

The Multics system matched the runners' numbers and finishing times with their names. It also gave a complete rundown on each runner's height, weight, sex, age and country.

HIS had taken this information from the runner's entry blanks to form the

data base. It assigned the runner numbers in order of qualifying times except for the top few numbers, which were preassigned and reserved for previous Marathon winners or Olympic champions.

HIS programmers divided the data base into three pools — those runners over 40 years old, female runners and men under 40.

The system was programmed to sort out the "unofficial runners" — those who had not officially qualified for the race — who had their times clocked as they went over the finish line, HIS officials reported. The total number of finishing times entered into the system was 5,492, but only 3,826 of those belonged to runners officially entered in the race.

HIS output the information by geo-

graphical area, finishing time, alphabetically by name, by runner number and by country, state and city.

Manual System Impossible

Whereas final race information previously took BAA officials months to compile, all the results were tallied and printed later that night, according to Jim Hannigan, HIS' manager of technical operations.

HIS has donated its equipment and programmer time for the last four years.

With the number of runners who now come from around the world to compete, it would be impossible to keep track of the race manually, he pointed out. In addition, the number of runners who cross the line at the same time and the speed with which

they follow one another also makes it impossible to manually record the race results accurately, he added.

One problem occurred midway through the race when a spectator ripped out a cable connected to the mini. The system was inoperable for several minutes because of it, Hannigan reported.

Since BAA officials were unable to get through to the finish line because of the huge crowds along the way, "we had to manually handle the times ourselves," he said. "Every 15 seconds, we recorded a runner number, then collected all the numbers and later spread out the times within a few seconds and kept it fairly accurate that way."

"But even though it's a madhouse, we're looking forward to next year's Marathon," he added.

Justice Decides Not to Ask Interim Relief

(Continued from Page 1)

Meanwhile, apparently less worried about delaying the case, IBM is still planning to ask Judge David N. Edelstein, who is hearing the case, to dismiss the charges against it when the government finishes presenting its final witness, probably by mid-May.

The government can ask for interim relief in antitrust cases when it feels it has made a strong prima facie case that the firm on trial has monopolized. Such proposals, which are rare, ask the court to restrict the activity of the alleged monopolists while the firm presents its defense in the case.

Previously, interim relief in the IBM case had been supported, at least philosophically, by Shenefield and by Sen. Edward M. Kennedy (D-Mass.), head of the Senate Antitrust and Monopoly Subcommittee [CW, March 6].

Delay Unwarranted

Shenefield said last week that while the Antitrust Division feels it has made a strong prima facie case that IBM monopolized the general-purpose computer market and interim relief might have been granted, the delay in the case would not warrant asking for such relief.

He noted that evidentiary hearings would have to be held on the

government's interim relief proposal and that any decision in the matter would certainly be appealed, thus delaying the main portion of the case and the final resolution.

Justice was worried about delay in the case, sources said, because it felt that IBM would demand an evidentiary hearing on the matter, which could take several months — at a minimum — and then the appeals could last for a year or so. All during this time, the main part of the case would probably be held in abeyance, the sources said, because IBM would claim that it could not carry on both actions at once.

At the same time, Justice feels it will be able to get fairly quick action on the remainder of the case — the IBM defense — since the government hopes to keep its cross-examination much shorter than IBM's cross-examination of government witnesses has been.

Because of these factors, sources said the Justice Department feels it can finish the entire case in the time that would have been spent arguing the interim relief motion and therefore have a final resolution of the case rather

than an interim solution to the problem of IBM's alleged monopoly power.

IBM Dismissed Motion

IBM still plans to present its motion to dismiss the case when the government finishes with its last witness, Dr. Lee Preston, in early to mid-May, according to current schedules.

However, the IBM motion to dismiss will not take as much time as would the government's interim relief motion.

Motions to dismiss are rather routine in large cases, and even IBM has expressed some surprise when they have been granted as in the Greyhound Computer Corp. and California Computer Products, Inc. (Calcomp) cases against IBM.

Instead of a lengthy evidentiary hearing on the matter as would have been required in the interim relief proposal, Edelstein has given each side just two days to argue the motion to dismiss.

Most observers feel Edelstein will quickly dispose of the IBM dismissal motion by rejecting it and thus call on IBM to begin presenting its defense in the massive case sometime in June.

Terminals Aid Truck Maker

(Continued from Page 1)

data is lost, and the terminals are merely reset to continue operation, he explained.

Only one terminal has been removed since they were installed, but even that did not significantly affect operations. "We just removed the terminal and jumped the connections," he said.

Although the company has not yet calculated how much money is being saved, it is pleased enough that expansion plans are under way.

The system consists of six Epic Data Corp. Model 1647-2 data collection terminals connected to each other in the plant and by phone lines to a local service bureau.

To input production data, an employee inserts his plastic-coated identification badge and an 80-column punch card representing the job he is working on.

The information by the terminals on the shop floor from the punch cards and ID badges is recorded on cassette at the service bureau for processing the following day and on a printer in

Williamson's offices for backup.

With this information, the company can spot bottlenecks by comparing the actual duration of any particular task with the expected duration.

The cards, which are prepared for each job on a keypunch, pick up dirt and grease from the manufacturing shop but only rarely cause misreads, Stephens said.

The terminal system, which was installed to replace a manual system, represents the first effort by the company at automated source data collection. Under the manual system, the time needed to complete tasks performed in building or repairing truck bodies was recorded by punching a time clock. Collecting, collating and transcribing the data from the time cards was inefficient and subject to errors, Stephens said.

After looking at systems offered by IBM and Panasonic Corp., Williamson selected the one made by Epic of Bellevue, Wash., because it is compatible with the Xerox Corp. Sigma 7 mainframe used by its service bureau.

VSI USERS

ACEP/VSI — A TSO SYSTEM FOR OS/VSI USERS.

- Hot Reader Remote Job Submission.
- Full Retrieval of Output at the Terminal.
- Local 3270 Support with Full Screen Edit.
- Remote ASCII & EBCDIC Terminal Support.
- Security & Authorization Facilities.
- Full Text Editing Capabilities.
- User Programming & CALL Interface Facilities.
- Dynamic Allocation.

MERIMAC

- OS/VSI System Software Monitor.

Call or Write: ARMAGGEDON ASSOCIATES, INC.
P.O. Box 1011, Danville, Calif. 94526, 415/755-0675

Service Bureau Head Says 'Yes' Federal Control of Data Leading to '1984'?

By Marguerite Zientara
CW Staff

CAMBRIDGE, Mass. — The Orwellian world of 1984, in which the government controls the collection and dissemination of information and thereby controls much of what people know and think, is just around the corner, according to Jerome S. Rubin, president of Mead Data Central, the Dayton, Ohio-based service bureau that runs the computerized Lexis law library.

Speaking at a seminar here on "Data Banks and Information Services: Public or Private" as part of Harvard University's Program on Information Resources Policy, Rubin was joined by Andrew A. Aines, senior staff associate for the National Science Foundation, who discussed information dissemination from the government's standpoint.

Besides the danger of an Orwellian society, Rubin said, there is another danger inherent in the collection, organization and dissemination of information by government: The government has difficulty regulating itself, since it is not responsive to a market or to shareholders.

At the same time, the private sector is subject to close government regulation such as that provided by the antitrust laws. The government, therefore, is powerful in both the public and private sectors, Rubin warned.

As an example of this governmental power, he cited the October 1977 announcement by the Government Printing Office (GPO) of the availability of free government-produced microfiche of such things as federal regulations, congressional debates, legislative bills, appropriations committee hearings and statistical publications.

This service, Rubin said, is a duplication of the products provided by the Congressional Information Service (CIS), a private firm. It is unclear at this time whether CIS will be forced to withdraw its competing line or go out of business completely, he added.

Rubin sees the plight of CIS as an example of the government's capitalizing on the work of the private sector. If private firms dealing in information are forced to go out of business, the government will then be the sole arbiter of what information is made available to the public, he pointed out.

Self-Regulation Lacking

As an example of the government's inability to regulate itself, Rubin cited the 1973 system development of Mead's Lexis, which was soon followed by Juris, a similar computerized law service at the Justice Department. Juris proved not to be a workable system, Rubin said.

The Justice Department then installed the successful Lexis system and modified Juris by copying features of Lexis, resulting in a better product, Rubin said.

A 1975 investigation into the matter by Antitrust Division of the Justice Department was inconclusive, Rubin said, and the publicly available files of the investigation indicate Justice was "embarrassed to investigate itself."

Under the Carter Administration, a new investigation was carried out last summer by Justice employees with no

previous connection to the case and by Federal Bureau of Investigation auditors. They found Lexis would save half the department's annual budget compared with the government's Juris system, Rubin said.

Questionable But Necessary

The role of the government "has always been a question and will always be one until the end of the earth," Aines maintained in his presentation. He contended, however, that if government were to get out of the information business completely, "there would be real calamity, the government would be in utter collapse and society as we know it would be impos-

sible."

Aines said that the government recognizes such problems as those presented by Rubin, but is concerned with the "information have-nots." These include U.S. citizens who need equal access to information in order to do their jobs and live their lives, as well as developing countries which have begun to demand free access to scientific and technological information, Aines said.

The problem of access is the major issue to be dealt with today, he added.

In an age of "paradox and irony," Aines said, one private group will demand the withdrawal of the government from information dissemination as other groups — governed by the

tenets of freedom of information and disclosure — demand greater dissemination of information. The federal Freedom of Information Act is supported by consumerists, the media and a Congress exasperated by executive power, he said.

The "for-profit" sector lacks a vociferous group to back it up and there is no incentive for the government to divest itself of the responsibility of information dissemination, he added.

There are presently 328 bills before Congress dealing with information computers and communications. The bills, Aines said, indicate Congress wants "better handling of information

(Continued on Page 8)

"ALL TP MONITORS ARE NOT ALIKE"

To the first time user most teleprocessing monitors must appear alike: "Multi-threaded, 3270 Mapping, Recovery, ease-of-use". That's what they all say. The new user often can't ask the specific technical questions necessary to choose between the alternatives. But, they learn the hard way after they select a product that won't do the job, consumes excessive computer resources, or provides poor performance.

We've been telling you all along that the SHADOW II TP monitor will give you all the features plus the best performance. In fact, more than half our users converted from other monitors (CICS and nearly every independent) to get these benefits. Clearly, they didn't replace another product for a 10% improvement. They wanted the 50 to 100% better SHADOW performance plus all the extra features.

These Shadow advantages prompted the replacement of CICS and all other monitors:

- low core requirements
- low CPU consumption
- high throughput
- powerful utilities
- extremely easy to use
- full restart/recovery
- comprehensive data base support
- powerful time-sharing facility
- high stability
- minimal system programming
- installs instantly
- outstanding Altergo support
- compatible DOS, DOS/VS, OS, VS, MVS
- fast response times

Call or write Altergo.

Ask the industry leader.

We can save the first-time user a big mistake or provide significant cost-savings for the current TP user.

Please send me information

Name _____

Title _____

Organization _____

Address _____

Zip _____ Phone _____

Disk Type _____ Number _____

Our need is ☐ immediate

☐ 3-6 months

☐ over 6 months

IBM-Amdahl Links Easing Users' Workloads

(Continued from Page 1)

"JES3 has had a lot of bugs associated with it, we've heard, and we are waiting until these are cleared up before we seriously consider moving into it," he added.

The company does not totally share all files between the two CPUs. "We've got our network files accessed only by the 470 because we do not want the 158 getting at them," Bologna said, but he noted this type of isolation is strictly a user option.

Part of a Mix

Combustion Engineering in Windsor, Conn., runs a loosely coupled configuration as part of a larger mix that also includes Central Data Corp. mainframes. The Amdahl 470V/6 acts as the global machine for a 370/168.

The Amdahl CPU replaced a 370/158 that was used as a back-end machine to the 168. When the 470 was installed in February 1977, this relationship was reversed and the 168 became the back-end machine to the Amdahl mainframe, according to Harry Dillman, director of computer services.

The smaller version of ASP that resides on the 168 takes about 5K to 7K bytes of storage, which is probably less than 3% of the total CPU memory, Dillman estimated. This is only a handshaking piece of software that links to the channel-to-channel connector between the two mainframes.

If the 168 were not loosely coupled to the 470, it would need the full ASP implementation instead of a smaller subset. You wouldn't want to run ASP on both CPUs because this gets very expensive. ASP is using about 23% of the storage in the Amdahl CPU," Dillman said.

The ASP controls all the scheduling within the DP center as well as the firm's terminal network, and the pre-execution of all I/O peripherals at the DP center.

The ASP code was "absolutely transparent and we lifted it right out of the IBM machine and put it in the Am-

dahl. There was a slight change in the SVS operating system where Amdahl had to provide for error recovery management, but this was minor," Dillman recalled.

"If the transparency had not been there, I doubt we would have considered an Amdahl in the first place," he added.

Dillman is planning to install an IBM 3033 at the end of this year. "We have every expectation the 3033 will work in the loosely coupled configuration. We have talked to IBM and Amdahl. Nobody has done this yet, but we see no problem with it at this point," he said.

Calvin Ross, a headquarters system engineer at Amdahl, is not convinced there are storage savings associated with the loosely coupled configura-

tion. He pointed out that if a user decides to run separate, free-standing systems, he would need JES2, which probably requires just as much code as having JES3 in global and local machines.

JES3 is a very large complex software system, Ross believes. Typically a global CPU has 1M byte or more of software and the local mainframe has 200K to 300K of an abbreviated version of the utility.

The major benefit of a loosely coupled complex, according to Ross, is that one machine can have responsibility for scheduling. It can determine how heavily or lightly loaded a local CPU is at any moment and make adjustments in the job. This has the effect of balancing the workload in the entire shop, he said.

Preexecution setup of I/O tape or disk subsystems is also important. If a particular job needs a tape or a disk setup it is much easier for a single mainframe to track the status of all the I/O devices rather than to have separate systems trying to do the same work.

In a loosely coupled system, each CPU must have a channel path to the I/O subsystem controllers so all of the needed devices can be accessed.

As part of the coupled capability, a CPU-to-CPU channel adapter is required; this can reside in either the IBM or Amdahl machine, he said. This channel-to-channel connection enables the global machine to send scheduling information to the local CPUs.

Fed Bucking Justice With Network Plan

(Continued from Page 1)

Federal Reserve computers sort and clear payment information recorded on magnetic tape and exchanged between financial institutions which subscribe to the board's services. Presently, 32 of the country's 33 ACHs receive direct operational assistance from the Federal Reserve.

The board intends to replace the check courier transportation system and low-speed communications lines that now link these offices with high-speed communications lines, a member of the Board of Governors, Philip E. Coldwell, said at a recent banking conference in New Orleans.

No Monopoly Seen

A spokesman for the Federal Reserve said last week that comments critical of the plan — including the opinions of the Justice Department — have been considered.

"The Board has no intention to establish, and does not believe that its ACH activities will lead to, a governmental monopoly in the field of electronic

payments," the spokesman stated. He added that "at the present time, alternative private-sector sources do not exist that have the capability to provide an adequate level of service on a nationwide basis."

While the Federal Reserve expects the private sector to develop the capability to provide interregional ACH sources in the future, the board has no intention of ending its current involvement in the operation of electronic payment systems, the spokesman said.

Coldwell warned that the Federal Reserve might be just the balancing force needed to prevent the nation's largest banks from taking over this field. To withdraw from that effort would be to abdicate "long-standing payment mechanism responsibilities," he added.

The feasibility and potential benefits of a nationwide ACH facility have been demonstrated in the U.S. Treasury Department's direct deposit program, in which consumers can have such recurring payments as Social Security benefits credited directly to their accounts, the spokesman said.

The Federal Reserve conducted a pilot test of interregional commercial payments during 1977. In the test, a low-speed 2,400 bit/sec line between the Federal Reserve's Dallas and Kansas City offices was replaced by a 56 kbit/sec line.

A file representing 10,000 payments could be transmitted in 3-1/2 minutes over the new line; the low-speed link required two hours to send the same payment volume, according to Coldwell.

The Federal Reserve argued that its creation of a nationwide ACH network would be a good research and development program, providing technical data and experience in the operation of such facilities. The ACH interconnection "is likely to encourage the private sector to provide more efficient and innovative payment services to the public."

The Federal Reserve System will make its R&D results available to those in the private sector interested in developing alternative systems, its Board of Governors promised.

Meanwhile, yielding to the pressure of the Justice Department and others that the board at least charge its member banks for EFT services, the Federal Reserve said it will publish a schedule of proposed prices for ACH services "as soon as [they] can reasonably be developed."

Overall, the board expects its actions "to enhance and improve financial services to individuals and to financial institutions, to encourage the use of electronic movement of funds as a more efficient and less costly alternative to check payments and to stimulate the development of nongovernmental services that will lower the cost of banking services to the public."



'Professor Osborne, I Think I Found the Answer to Our Puzzle.'



NCR 260-5 PORTABLE KSR TERMINAL NEW EQUIPMENT

Just
\$1595

Regular List Price
~~\$2495⁰⁰~~

Special Purchase

IMMEDIATE DELIVERY
Call Us Today

FEATURES:

- Quiet Thermal Printing
- 10 or 30 CPS Printing
- Full 128 Code ASCII
- Built In Acoustic Coupler
- EIA RS-232 - 20 M.A. Loop
- 90 Day On Site Warranty
- Serviced Nationally by NCR

iti
Information technology, Inc.
154 Wells Avenue, Newton, Massachusetts 02159
(617) 969-2100

BURROUGHS USERS—A LINE PRINTER FOR YOU.

**At 30 to 50% off
Burrough's price for
the same printer.**

If you have a 300-1800 LPM printer requirement, contact BDS. Don't buy your printer from Burroughs. Do buy the same Dataproducts printer that Burroughs offers, but buy it from BDS and save 30 to 50%.

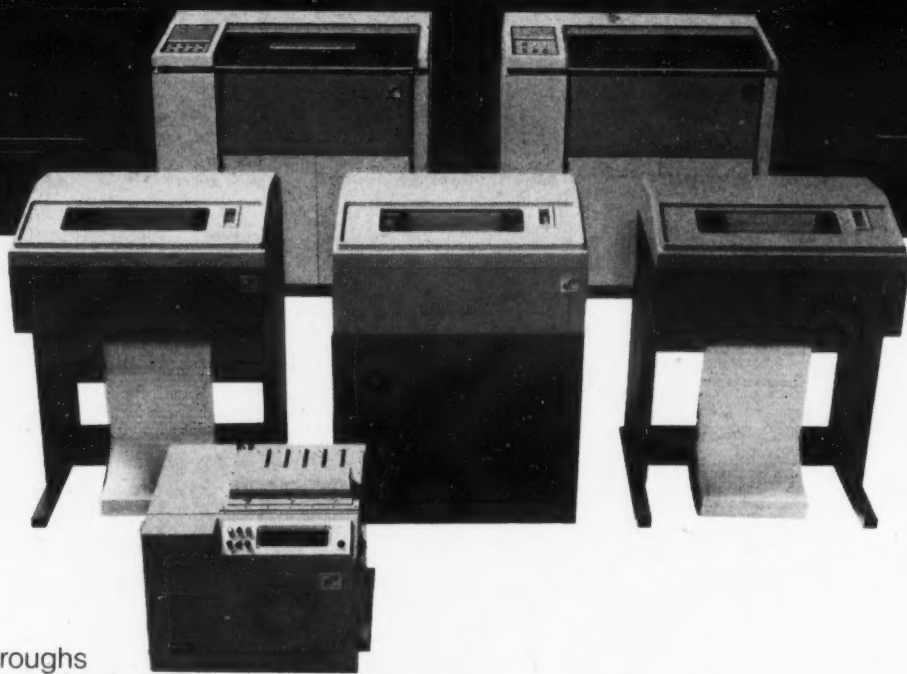
BDS printers are in complete conformity to Burroughs specifications. We supply the interface required to make the printer 100% compatible with your CPU buffered controller. If you don't have a buffered controller, BDS will supply either the PCC version, or the new DLP (Data Link Processor) version for your X800 System.

BDS delivers fast for we are stocking distributors. And we offer national service.

Featured in the Dataproducts list of line printers:

- ☐ The 2200 Series-gives significantly low operation cost at 300, 600, and 900 LPM.
- ☐ The 2550 Charaband-sets a new standard in horizontal font printers at 1200-1500 LPM. An added bonus— two character sets standard.
- ☐ The 2470 Heavy Duty Drum-offers real price performance advantage at 1500-1800 LPM.

The business of BDS is selling Dataproducts printers to the end-user and System House marketplace. We have sold hundreds of these printers to Burroughs, DEC, HP, and practically all mini-users. So, if you are interested in saving 30 to 50% of printer costs, call us or mail the coupon.



**Yes, I want to save
30 to 50 % of printer costs.**

The computer system I use _____

My line printer requirements are _____

Name _____

Title _____

Company _____

Street _____

City _____ Zip _____

State _____

Telephone _____

BDS Computer Corporation, 1149 Chestnut St.
Menlo Park, CA 94025, (415) 326-2115

PRICE PERFORMANCE			
Speed (LPM)	Dataproducts Model No.	BDS Prices	
		Printer	Controller and Cable*
300	2230	\$14,000	\$2,500
600	2260	18,000	2,500
900	2290	25,000	3,000
1200-1500	2550	32,000	3,500
1500-1800	2470	32,000	3,500

*Required only if your present CPU needs printer buffered controller.

BDS

**BDS Computer Corporation, 1149 Chestnut Street
Menlo Park, CA 94025, (415) 326-2115**

EFT Endangering Savings, Annunzio Charges

By Catherine Arnst
CW Staff

ST. PAUL, Minn. — Electronic funds transfer (EFT) systems could cause an individual to lose his entire life savings "without any possibility of getting the money back," Rep. Frank Annunzio (D-Ill.) charged here recently.

He pointed out that under present law, there is no legal limit on the amount consumers can lose from their accounts when an EFT card is used without permission. In contrast, the maximum amount of consumer liability when a credit card is similarly misused is \$50.

Annunzio made his charge at last month's hearings here on H.R. 8753, the Consumer's Credit Protection Act Amendments of 1977. Annunzio in-

troduced the bill last August to protect consumers using EFT and credit cards. That bill is now in the final mark-up stage in the House Consumer Affairs Subcommittee, of which Annunzio is chairman.

A major provision of the bill would place a \$50 consumer liability limit on EFT cards. In addition, if funds were transferred from an account without the use of a card, the bank would be totally responsible for the loss.

Other provisions of the bill would give consumers the right to "stop payment" when they buy goods or services, just as a check can be stopped; would allow consumers to request and receive corrections of errors in their accounts, a service now provided at the whim of the bank; and would make

the bank responsible for any loss or damages that occurred to a consumer because the bank didn't make an electronic preauthorized payment, such as an insurance payment.

Bank Requirements

The bill would also require a bank to provide vital information to a consumer before he receives an EFT account, such as any charges levied and the terms and conditions of the account agreement, as well as his rights under the law. Banks would also be prohibited from sending out unsolicited EFT cards.

The bill also calls for giving the consumer a receipt listing details of the EFT transaction whenever something is paid for electronically or funds are

transferred. Today, no receipts are required by law. A seller would be prohibited from charging more for a purchase paid by check than by EFT, and false or misleading advertising of EFT services would be prohibited.

The consumer subcommittee held hearings on the bill recently in Washington, D.C.; Chicago; Columbus, Ohio; and St. Paul, Minn. In opening remarks at the Columbus hearing last month, Annunzio charged that "EFT systems and the Edsel have a lot in common." They "look good on paper but simply will not sell. I am not convinced that large-scale developments of such systems are presently in the interest of the country, banks or the public."

He quoted Robert E. Knight, research officer and economist at the Federal Reserve Bank of Kansas City, Mo., as saying in 1974, "If I were to receive an [EFT] card tomorrow . . . I would do only one thing — cut the card up into 25 little pieces and send it back to the bank."

Annunzio cited the testimony of a Texas man whose EFT card was either lost or stolen and subsequently used to withdraw \$2,300 from his bank account. Although the personal identification number was not used with the card, the bank refused to reimburse the consumer, even though he had reported the loss of the card, Annunzio said.

After he asked the Federal Deposit Insurance Corp. to look into the situation, that institution wrote that although the facts of this case were in dispute, "even if we were able to document what actually occurred, the law is unclear as to where the liability would lie . . . Since there is no federal statute controlling liability in this situation, it would appear to require both a court's interpretation of state law and a court's resolution of disputed facts."

Orwellian World Coming Soon?

(Continued from Page 5)

by federal agencies" rather than private-sector handling of information.

In this post-industrial era of U.S. development, Aines said, half the gross national product is associated with the "knowledge industry." Data is changing the way people communicate and is changing the whole structure of society as well.

The government must try to develop a policy for managing its own huge information programs efficiently while maintaining the privacy of individuals, he stated, and the private sector must support the existing information systems.

Aines said he could not imagine how the private sector can say "with a straight face" it is effective when all its information is obtained from the government free of charge.

Maintaining that the U.S. needs a strong "for-profit" sector as well as strong federal programs at all levels, Aines recommended high-level government programs to oversee the transmission of data and maintain information networks while trying to minimize duplication and overlapping of information.

THE ONLY COMPANY THAT MAKES A BETTER COMPUTER TERMINAL THAN COURIER IS ITT COURIER.

Courier Terminal Systems, Inc. is the leading independent manufacturer of IBM compatible video terminals. The acquisition of Courier now establishes ITT as a major force in the computer terminal market.

As the largest source of IBM compatible terminals, Courier has installed over \$125 million worth of computer terminals worldwide. As ITT Courier, we plan to provide even better products, broader service coverage, and more comprehensive systems.

Courier also manufactures and markets a unique point-of-service system that served over 175 million fast-food customers last year. As ITT Courier, we will accelerate such innovative product developments and broaden our efforts in this rapidly growing market.

Since 1974, ITT has marketed Courier terminals in 13 European countries. This timely merger expands ITT's role to manufacturing and marketing this equipment worldwide. ITT adds resources and strength to Courier; Courier brings the talent and vitality needed to realize this worldwide commitment.

Courier Terminal Systems, Inc., now

ITT Courier

Call Toll-Free 800-528-1400, Ext. 274
P.O. Box 29039, Phoenix, AZ 85038
TWX 910-950-0147
In Canada Call 416-251-3335

© 1978 ITT Courier Terminal Systems, Inc.



But Could Open Pandora's Box

Ribicoff DP Crime Bill Called Valuable Weapon

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Passage of the computer crime bill introduced in the U.S. Senate will certainly be "a new and valuable weapon in the fight against white collar crime," the assistant attorney general of the Justice Department's Criminal Division, Benjamin R. Civiletti, recently wrote to Sen. Abraham Ribicoff (D-Conn.), the chief sponsor of S. 1776.

But the proposed law as currently drafted [CW, July 4] will also provide a key to the Pandora's box of the computer and communications industries, unlocking such issues as the taxation of software and the professional status of systems analysts and programmers.

For example, the bill, which would make abuse of government systems, computer operations of certain financial institutions and systems involved in interstate commerce a federal offense, specifically defines computer programs as "property." As "property," software is eligible for taxation, attendees at a breakfast meeting sponsored by the Washington office of the Data Processing Management Association held to discuss the bill noted.

The proposed legislation contains no reference to the malpractice liability of systems analysts and programmers who may ignore established security techniques in designing a computer system or writing a program for it. However, the bill's passage and the creation of criminal sanctions against computer fraud and abuse would bring industry practitioners a step closer to civil penalties for failing to emphasize security in system design and operation, other attendees suggested.

Philip R. Manuel, an investigator on the Senate Governmental Affairs Committee, which conducted the study that led to Ribicoff's introduction of computer crime legislation last June, told the meeting that the proposed law is intended to "bring us up to speed" in legal protection against electronic forms of white collar crime.

Current Law 'Inadequate'

Current law is inadequate to permit easy prosecution of the computer criminal, Manuel said. He referred his listeners to a case cited in the Governmental Affairs Committee Computer Security Study as an example of the deficiencies in present criminal law.

In the case of U.S. vs. Bertram Seidlitz, the computer was used as an accomplice, Manuel explained. Seidlitz used a portable terminal, the telephone system and his knowledge of certain access codes to obtain access to the computer operation of his former employer, Optimum Systems, Inc. (OSI).

Seidlitz worked from his home in Maryland and from his computer business in Alexandria, Va. He accessed various portions of OSI's Wylbur system (a software package governing the firm's contracts with various government agencies) at least 40 different times in approximately four months to build his own data base of contract information.

OSI discovered Seidlitz's activities by accident and called in the Federal Bureau of Investigation (FBI). Working with the telephone company, the bureau succeeded in tracing Seidlitz's tel-

ephone calls. The FBI used search warrants to seize computer printouts with OSI information at his office and the terminal was located at his home.

Seidlitz was indicted on two counts of wire fraud and one count of interstate transportation of stolen property, according to Manuel.

FBI agents were fortunate in receiving cooperation in the case from OSI officials and from the telephone company. They were also lucky to find the "stolen property" in such a tangible form as a computer printout.

If Seidlitz had transferred the information he obtained from OSI onto magnetic tape and stored them with his library of tapes, would investiga-

tors have been justified in searching his entire tape library? This is a very important question, Manuel said.

Presently, there exists no federal legislation which specifically is intended for such computer-related crimes, he indicated.

Example of Limitations

"The wire fraud statute is useful if it can be proven that an interstate communication was made; on the other hand, if Seidlitz had used his residence as his base of operations to obtain the computer program, then the wire fraud statute would have been useless," Manuel said, quoting the U.S. attorney who handled the case.

He also pointed to the wire fraud statute requirement that "money or property" be stolen or used for fraudulent purposes.

So far, Manuel noted that neither the Senate Governmental Affairs Committee nor Ribicoff's office have received opposition to the bill on the basis of its implications for software taxation or for the licensing and regulating of computer programmers and analysts. He invited debate on these issues, however, at hearings on the computer crime bill to be held soon before the Senate Judiciary Committee's Subcommittee on Criminal Laws and Procedures under the chairmanship of Sen. Edward M. Kennedy (D-Mass.).

The video terminal professionals
of Datamedia

working wonders



at thousands of user sites worldwide

Designing a video terminal family is only half the battle. What separates Datamedia from the others is our ability to deliver a reliable product — consistently. • And that's just what we've been doing since 1968. • Delivering a family of general-purpose alphanumeric display terminals. • Providing performance-proven products at a moderate price. • Establishing, with our family of Elite video terminals, a new standard in terminal reliability. • Helping users in industry, business services, government, education, medicine, and research around the world get what they want from their video terminals.

Datamedia Video Terminals.
Stand in front of them;
you'll see why we stand
behind them.

**Datamedia
Corporation**

7300 N. Crescent Boulevard
Pennsauken, NJ 08110
609-665-2382
TWX: 710-892-1693
Sold throughout North America and the world

See us at the
Computer Expo
in St. Louis,
Chicago and
Detroit

I'd like to have more about Datamedia video terminals in front of me.

☐ Please have a salesman call me to discuss my specific needs.
☐ Please send me information on your complete product line.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

Conferees Urge MIS Heads to Know Business

By Brad Schultz
CW Staff

NEW YORK — A new breed of management information system (MIS) administrator is emerging because top management now stresses business acumen more than technical expertise in evaluating MIS chiefs.

Several speakers at an MIS state-of-the-art colloquium held here recently presented this view, explaining that administrators grounded in general business, rather than technology, are better qualified to present MIS designs with the needs of their firms.

Today's MIS chiefs report to the "mainstream" of their organizations and must have insight into profit and loss, production and other business considerations, according to Fred H.

Lambrou, General Foods Corp. information services director.

Less than 30% of today's MIS managers report exclusively to the financial wing of their organizations. This figure was about 90% 10 to 15 years ago, Lambrou said at the one-day gathering sponsored by The Conference Board for senior general and technical managers.

Objectives Confused

Paul Dixon of Massey-Ferguson, Ltd. indicated that technically oriented MIS managers have occasionally lost sight of their objectives, striving to create a technically sophisticated system that may not be cost-justified. The primary purpose of MIS is to make more money for the organization. Only after

doing that should an MIS be used to figure how much money has been made, Dixon said.

Dr. John F. Lubin, the keynote speaker, told the MIS experts that "a lot of management doesn't trust you anymore because corporate leaders have been stuck with an MIS 'juggernaut' they don't know how to stop."

An MIS that was designed to meet the demands of a departed chief executive may prove inadequate for a firm because his demands may have become unrealistic in the period between design and implementation — if they were not so at the time they were made, Lubin explained.

Lubin called this the "standard incumbent problem" and said that two remedies are to shorten the time inter-

val between major revisions of the MIS or to ensure that the system can handle a rapidly changing environment.

Earlier designs of MIS have in many cases turned out to be "absolutely naive and crazy" for use in 1978, Lubin said, noting that these designs were done by technicians who did not properly understand the business needs involved. The dean of the University of Pennsylvania Wharton School also said organizations should do careful feasibility studies before implementing any MIS.

Business-Oriented Managers

"I seriously question whether there are that many computer technicians still managing all of a major corporation's information services functions," Herbert Z. Halbrecht, president of the Society for Management Information Systems, told the conference.

"Bright, capable, ambitious young people" are no longer attracted to MIS positions or departments, which they regard as "dead-end," Halbrecht added.

"Ten years ago, the more entrepreneurial, ambitious professionals in the information services field had opportunities outside their companies to obtain venture capital to start their own firms ... Those days are now long gone and in all likelihood will not return," Halbrecht asserted.

"Competitive, ambitious risk-takers who want to run their own show look at the history of advancement opportunities for MIS directors and decide that's not the function they want to enter," he continued.

Management Pyramid

Where an organization's management structure and information flow might be represented by a pyramid, technically oriented MIS managers perhaps function best, according to Glen W. Belder, president of United Airlines' Computer and Communications Division. In such a scheme, the number of managers diminishes as the information flows up the corporate hierarchy. A given individual in this environment usually reports only to one superior.

However, many firms have discovered the inadequacy of pyramidal information flow, Belden continued. For example, if a new product line is introduced by a manufacturing firm, a large number of higher management people will be interested in its marketing progress and will want to access the MIS that reports this progress.

These higher management people will each have needs germane to their functional interest — production, operations, marketing or development —

(Continued on Page 11)

TERMINAL CASES.

TTY 43 Case



Teletype can be removed or used in place.

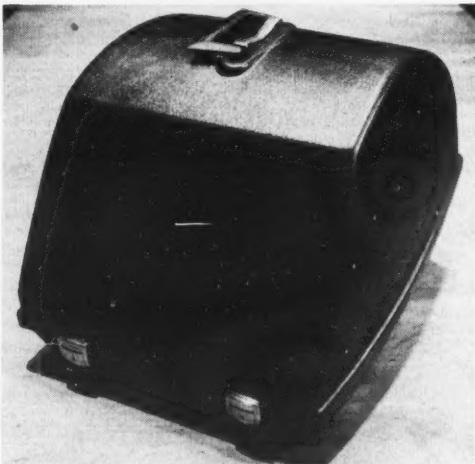
ADM-3A Case



CRT and coupler can be easily removed or used in place. Coupler can be as large as 4 1/2" x 11" x 7 1/2".



Handsome case fits your TTY 43 like a glove.



A smart case for the dumb terminal.

Now you can conveniently take your terminal with you for demonstration or late-night work at home. Consider the price of an ADM-3, coupler and case (approx. \$1,300.00) compared to a portable CRT. And the price of a TTY 43, coupler and case (approx. \$1,650.00) compared to a wide-carriage portable printer.

TTY 43 Case: \$149.95 each. ADM-3A Case: \$169.95 each. Quantity discounts available.

Patents Pending



CHESS

1155 Speer Boulevard
Denver, Colorado 80204
Phone: (303) 573-5135

Texas Instruments
Portable Data Terminals
FOR SALE

• 743 • 745

BEST PRICE • FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960

Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

... But One Firm Tells Them to Talk Business

NEW YORK — The nation's largest diversified financial company operates its management information system (MIS) with an emphasis on regular, open communication between departments, according to Aetna Life & Casualty's vice-president for DP and administrative services, Irwin J. Sitkin.

Sitkin told a special session on financial industry MIS evaluation at The Conference Board's MIS colloquium held here recently that "Aetna's business is information, and it is essential that we get the right information to the right people at the right time so the right decision can be made in the effort to stay ahead of our competitors."

Most of Aetna's operations are of a DP or information management nature, Sitkin said. "Our management considers the DP resource an integral part of our business activity and a major factor in achieving the company's business goals," he added.

Aetna's systems analysis and programming staffs function in the "mainstream" of activity, working closely with decision makers, he noted.

Steering Committees

Every major Aetna division has its own systems development department to perform its systems analysis and development work and a steering committee to assure responsible management direction, he continued.

The steering committee is normally chaired by the division head and serves

MIS Heads Need Business Skills

(Continued from Page 10)

and the MIS manager will be confronted with a diversity of information needs that require him to have a business insight that a DP technician would not have, Belden indicated.

William I. Spencer, Citicorp president, told the conference that "no MIS, however sophisticated, can replace effective line managers. The ability to convert business information to sound judgments is distinctively human."

"That intuitive, gut-level sixth sense we sometimes call a 'good head for business' is actually the ability to assimilate and analyze information so quickly as to seem unconscious," Spencer said.

"Even managers with this knack and with long career experience to draw on should be able to tap the MIS in forming judgments. If the only person who finds a use for the MIS is the company president, something is drastically wrong with it," he added.

Isaacson Named Fellow at EDS

DALLAS — Dr. Portia Isaacson, international authority on microprocessors and home computers and a pioneer in the field, has been named a research fellow by Electronic Data Systems here.

Isaacson will continue writing and lecturing widely to business, academic and professional groups. In addition, she will be working for EDS as a teacher and advisor.

to direct DP plans and budgets, establish priorities for major projects and oversee the application of resources.

"There is also an informal or 'matrix' organization structure (including committees, task forces and project teams) that provides needed communications channels and greater visibility of information processing resources to all levels of management," Sitkin added.

During the annual planning effort, the development departments establish production service goals and objectives for creating or enhancing information systems.

These service goals include availability and response time targets for Aetna's major on-line systems and networks, rerun and timeliness goals for reports produced in a batch produc-

tion environment, turnaround time measurements for remote job entry work and person/day forecasts for systems design and development, he said.

Hardware Management

All of the large-scale DP hardware and much of the smaller hardware is centrally located at corporate headquarters in Hartford, Conn. Sitkin manages the hardware, 2,100 people and a 1978 budget of more than \$63 million.

All hardware failures are documented daily, showing cause and corrective action taken, and are recapped monthly, Sitkin said. Extended outages are researched and documented to assist in monthly management review sessions

with major vendors.

Hartford and 945 other U.S. installations provide input to a data base to track hardware reliability, and the ratio of error recovery activity to use by device type is reviewed monthly, Sitkin added.

In addition, teleprocessing network costs and volumes are tracked over time to monitor the relationship between expenses and resource utilization by major on-line systems, he said.

Aetna's DP planning and control department presents a quarterly report that provides current status information on all major DP projects to the firm's corporate management committee. This committee is comprised of Aetna's five highest ranking officers, Sitkin said.

"Adding a Memorex 6400 Semiconductor Memory multiplied our capacity by two and cut turnaround time by two-thirds. 'That's the kind of math our college loves!' —Gunter Klein

Mr. Klein is Manager of Data Processing for West Valley Community College District in Santa Clara and Saratoga, California. From its two campuses in the heart of the Santa Clara Valley, home of the semiconductor industry, the district serves over 23,000 students. Approximately 500 of them are enrolled in courses involving direct use of the college's data processing system.

"Before leasing Memorex's 6400 Semiconductor Memory for our System 370/135, we had a total capacity of 512K and our response time averaged 15 seconds. Now our students get a response within 3 to 5 seconds with the addition of the new memory and a new T.P. monitor."

Besides providing for student needs, Mr. Klein's department also serves the college's administrative, management, and record-keeping needs with 32 on-line CRTs.

"Since installing the 6400, all of our inquiries are being answered more quickly and efficiently."

West Valley's 6400 Memory System was installed, tested, and fully operational with time to spare.

"We chose the Memorex Add-On because it provided the right price-performance mix. Furthermore, we didn't have to wait for delivery. Memorex met our time schedule. We're always looking for new ways to improve our capability. That's why we went to Memorex."

For more information ask your Memorex Representative, locations in principal cities worldwide, or contact Memorex Semiconductor Memories, San Tomas at Central Expressway, Santa Clara, California 95052, phone (408) 987-1981.

MEMOREX
SEMICONDUCTOR MEMORIES

Parent Locator Service a Success

DP Snare of Runaway Parents Nets \$1.6 Billion

By Edith Holmes

CW Washington Bureau
WASHINGTON, D.C. — The federal-state "runaway parents" program has helped the states net \$1.6 billion over the past two years by using computers to trace absent parents — chiefly fathers — and then forcing them to support their children.

Department of Health, Education and Welfare (HEW) Secretary Joseph A. Califano has deemed the effort a success, pointing out that the funds recovered equal 10% of

the national cost of the Aid to Families With Dependent Children (AFDC) program.

And critics who initially called the Parent Locator Service an unwarranted intrusion of the federal government into personal lives — an invasion that would yield little while costing much — are not nearly so vocal.

Califano has directed his aides to try to double the amount collected — from \$1 billion in fiscal year 1978 to \$2 billion in 1979.

When the program to track

down parents of welfare children was pushed through Congress by Sen. Russell B. Long (D-La) in August 1975, leading social welfare experts testified in Senate hearings it would be pointless because most of those sought would have no money for the federal and state governments to collect.

While all the statistics are not yet complete, last year's experience indicates at least half of the fathers traced "Have the capacity to pay some reasonable level of child support and some have rather substantial incomes," according to the deputy director of the Office of Child Support Enforcement, Louis B. Hays.

For example, officials in Sacramento, Calif. working on one nonsupport case discovered the father was a retired military officer who was collecting a pension as well as a salary from a second job and had a total income of \$60,000 a year, Hays said.

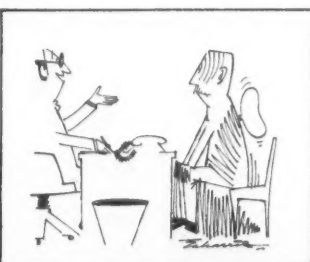
In another case, in Michigan, a former law student who had divorced his wife years earlier and had fallen \$5,000 behind on \$20-a-month child support payments was tracked down when his family went on welfare. By this time the man had become a judge.

A Million 'Found' Parents

After just over a year of operation, the Parent Locator Service, which comprises one-third of the effort of the Child Support Enforcement Office, has one million parents making regular payments, when they would otherwise pay nothing to aid their children, Hays said.

Some states have reaped big dividends, he added. For example, in the past year California collected \$141 million and Pennsylvania \$156 million under the program.

Four years ago, a woman who wanted child support from the father of her children had to go to court or to a state welfare agency, establish paternity if it were in doubt and then seek an order requiring payment by the father. The process required money for legal fees and an understanding of the court and welfare systems; few states had agencies that could provide guidance or take over these responsibilities.



'You Must Learn to Unwind.'

Long changed all that by proposing the amendment to the Social Security Act that created the Parent Locator Service in HEW. The amendment required that every state, as a condition of receiving federal AFDC welfare subsidies, set up a unit specifically charged with finding "fleeing fathers."

The states were required to give assistance not only to welfare mothers, but to any parent with children when the other parent was absent and not participating in the children's support.

Weekly Procedure

Much of the federal assistance to states has been automated or will be within this year, Hays said. Thirty-one states are linked to the Office of Child Support Enforcement through Computer Science Corp.'s Infonet time-sharing network.

Every week, Hays said, his office takes all the requests for information on absent parents and generates computer tapes which are then fanned out to such federal information sources as the Social Security Administration (SSA) and the Internal Revenue Service (IRS).

The SSA responds to these requests weekly, providing Hays' office with the address of the delinquent father's or mother's employer. The IRS provides on a monthly basis (the exchange will become weekly this summer) the parent's home address and some determination of ability to pay child support based on past income tax records.

The HEW child support office also has an automated link to the General Services Administration's National Personnel Records Center in St. Louis, where additional information on all civilian employees of the federal government is maintained.

VA Involved

Still another agency providing income information to the locator program is the Veteran's Administration (VA). So far the exchange with the VA has been manual, but Hays hopes to see it automated this summer.

Once the computer tapes containing the answers to the states' questions have been returned to Hays' office, the data is entered into Infonet and the states either receive a printout of the information on their terminals or get a hard-copy of the data in the mail.

Hays' office is also seeking to help the states with their efforts to computerize by creating Locator program computer models to handle the heavy fiscal and management re-

sponsibilities required by law.

The deputy director indicated that privacy constraints on data passing between his office and the other federal agencies involved in the program are not as great as they are between the state and local agencies and the Office of Child Support Enforcement.

Privacy Enforcement

"We do have to enforce confidentiality of this information by the states to ensure that the data won't be used for anything else," Hays stated. His office enforces privacy by requiring written certification from the states that they will keep Locator information confidential.

In addition, Hays noted, there are routine, on-site audits made of state operations by the federal government.

Some privacy concerns over the program remain, however. Central to these concerns is the provision in the federal law that requires a welfare mother to cooperate in establishing paternity and locating the father unless it is determined such action would not be in the child's best interest.

T-SHIRTS

Posters,
Memo Pads,
Sweatshirts, and
General Nonsense...

Free Brochure...25
cents

**THE INCREDIBLE
SYSTEMS & T-SHIRT
COMPANY**
Box 2623
Menlo Park, CA 94025

3 days.

DBMS:
a comparative
analysis

A practical guide to DBMS that will help you understand the various types of data base management systems available, and select the one that's right for you. A firsthand comparison of the characteristics, features...and drawbacks of the major commercial systems.

Enroll now for:

- New York: May 17-19
- San Francisco: May 31-June 2
- Chicago: June 5-7
- Washington: June 21-23
- Philadelphia: June 28-30

for
FREE COURSE OUTLINE
and full schedule of EDP seminars, call
800-257-9406

dataprobe

1805 Underwood Blvd., Delran, NJ 08075
(609) 399-7400

NEW

**TEXAS INSTRUMENTS
CALCULATOR
for the
COMPUTER
PROGRAMMER**

\$59.95

It calculates and converts in hexadecimal, decimal, and octal. Eliminates conversion tables and tedious longhand methods.

\$59.95 postpaid with battery pack, adapter/charger, case, and manual. 10 day return privilege. Phone orders, and bank cards accepted. Foreign orders invited. Also purchase orders from established companies. Immediate Delivery. Our toll-free credit card order line is 1-800-521-1534. Mail your order to address below.

Just say charge it! Which card?



NCE/Compumart 1250 N. Main St., Dept. CW48
P.O. Box 8610, Ann Arbor, Mi. 48107 (313) 994-4445

GAO Finds Agencies Lack Top Management Support Of DP Security Functions

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — A General Accounting Office (GAO) survey of 10 federal agencies has revealed a lack of top management support for computer security, according to Morey J. Chick, a GAO supervisory auditor.

Addressing a symposium on privacy and security sponsored by the Social Security Administration (SSA), Chick reported that the security personnel in these agencies have been given neither the authority nor the independence necessary to effectively guard sensitive and personal data.

Generally located within the DP operations in these agencies, the security offices suffer from fragmented responsibilities and an inability to go directly to top management when problems arise, the GAO auditor said.

The GAO findings will be released in report form within the next few months, Chick added. The study of the 10 agencies, begun in March 1977, surveyed the U.S. Postal Service, the National Park Service, the U.S. Customs Office, the Civil Service Commission, the U.S. Mint, the Department of Health, Education and Welfare's Office of Education, the Small Business Administration, the former Federal Energy Administration and Energy Research and Development Administration and the SSA.

While the GAO has not yet determined what recommendations it will make to the federal government regarding computer security, Chick strongly suggested the need for a separation of the security and DP functions and for top management "support and interest."

"Comprehensive procedures" — to protect individual and business data that could be sensitive and to permit quick action in emergency situations — are a must, he noted.

'Intuitive' Selection

Eight of the 10 agencies surveyed selected their security safeguards "intuitively," Chick stated. No risk management techniques were used to determine which security threats needed to be minimized to bring these agencies in line with such laws as the Privacy Act of 1974.

In all probability, the GAO will recommend that such risk assessments be made. Risk analysis should consist of a data sensitivity study, a determination of where an agency is vulnerable, the potential threats to which the agency is subject, the probability of those threats occurring or being carried out, the safeguards available and the costs and benefits of the safeguards the agency would like to implement.

Even after they are selected, safeguards should be routinely evaluated, particularly when a new recordkeeping system is installed, Chick said.

Because they did not perform risk analyses, eight of the federal agencies surveyed did not know whether they were under- or oversecured, the GAO auditor added.

Neither management nor procedures required the two agencies that conducted risk analyses to monitor the

safety measures they had in place, Chick continued.

One agency with a total of 290 data systems, 80 of which contained sensitive information, had only one person manning its security office. "He couldn't monitor the agency's security program all by himself," Chick said.

Another agency, which had its DP operation supported by an outside contractor, never tested the safeguards promised by its vendor, he stated.

Sketchy Training

The agencies polled offered employees little or no training in security measures, the GAO found. One agency provided training on physical security requirements; two others treated their employees to five hours on privacy regulations; still another regularly showed its people a 10-minute film on security, Chick reported.

The GAO believes none of these efforts constitute sufficient security training, Chick said. Terminal users, in particular, need to know about their responsibilities for system security and the vulnerability that accompanies keyboard or CRT access to a DP system.

In its survey, the GAO observed that remote terminals were not locked at one agency, that keys were given out to the janitorial staff and that there was no list of keyholders.

Ineffective Measures

Many security measures were ineffective because they weren't routinely checked by the agencies, Chick stated. For example, in one agency there was no control over building entrances and exits. In another, a television camera had been set up to monitor the computer room, but no one was assigned to watch the screen, Chick reported.

Printouts containing information on individual citizens were found all over the desks of employees of one agency, Chick added.

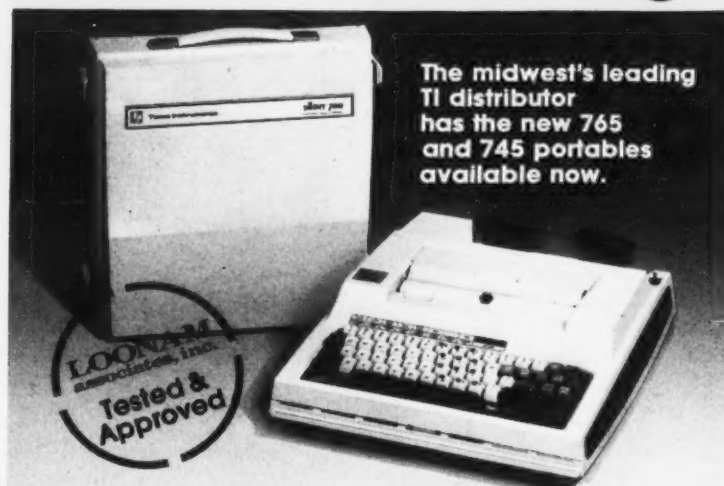
Some technical safeguards were ineffective because they weren't observed by the agencies. In one instance, several employees used the same password to access their agency's CPU; in another, no effort was made to encrypt or otherwise disguise passwords in the job stream.

GAO headquarters here indicated the report will come out in three months and will probably be sent to Rep. Richardson Preyer (D-N.C.), whose House Government Information and Individual Rights Subcommittee has expressed an interest in the government's computer security.



'You're Going to Get Three Balls, Then Fly Out to Left Field.'

Here's a TI 765 with an advantage.



The midwest's leading TI distributor has the new 765 and 745 portables available now.

What's the Loonam advantage?

1. LOONAM DELIVERS NOW. We are big in the computer terminal business. Our over half a million dollar inventory assures prompt delivery of TI and other computer terminals.

2. IT'S LOONAM TESTED. We test terminals before shipping.

3. A LOONAM 90-DAY WARRANTY. That's 90 days on every new terminal from the time it leaves our warehouse, not 90 days from the manufacturer.

4. THE LOONAM SUPPLY LINE. It's complete! We stock supplies for each and every terminal we sell.

5. IT HAS LOONAM SERVICE. Our customers think Loonam people are the most courteous and competent in the business. Our customer service is famous for quick, efficient handling of your requirements.



5420 Edina Industrial Blvd.
Minneapolis, MN 55435

Call Loonam hotline: 800-328-4028, in Minnesota call 612-831-1616

Branch offices in Milwaukee, Omaha and St. Louis

INVENTORY SALE

DEC	LA-36	30 cps Teleprinter
	LS-120	120 cps Teleprinter
	LA-180	180 cps Printer

*All Standard DEC Options

While they last - at

UNBELIEVEABLE PRICES

ALSO - Lear-Siegler
ADM-1A, ADM-2, ADM-3A
Sykes - Comm-Stor
Multi-Tech - Acoustic Couplers



James L. Highsmith & Co.

3733 Monroe Rd. • Charlotte, N.C. 28205

1-800-438-4942
Toll Free

1-704-333-7743
in North Carolina

Editorial Fiber Optics

Fiber optics is not the latest thing in technology. The principle of transmitting information on a beam of light have been understood for some time.

Like other breakthroughs, when someone actually inaugurates a commercial application, the technocrats come out with glowing promises on how great it will be.

The transmission of data between a terminal at the Houston city library [CW, April 17] and a remote Univac CPU has some important implications for data communications users.

The biggest hurdle for any network is the availability of economical local loops. These are the connections between a DP user's premises and the nearest central office or terminal of a common carrier, such as the telephone company. Fiber optic cable, compared with copper wire, may be a low-cost method to expand local-loop facilities.

Until now, fiber optic technology has been marking time until some basic features could be worked out. A beam of light cannot make sharp turns like an electrical wire unless the conducting material remains in one piece to carry the beam without

interruption. And the splicing of a glass conductor must be done with precise alignment to be sure the light is not interrupted in its path.

These problems are being worked out and the viability of fiber optic links, at least for short-haul transmissions, is growing. For longer haul links in which optical repeaters are required, the cost may be less attractive.

From the user's standpoint, signals are converted from electrical to optical impulses and the technology is essentially transparent to existing DP equipment. Another benefit is security — data sent over a light path cannot be tapped in the way electrical signals can be intercepted by unauthorized eavesdroppers.

Presumably, once a fiber optic link is properly installed, very little can go wrong with it as long as the integrity of the optical path is not altered.

All in all, this form of transmission promises significant, if not startling, benefits for users in certain applications. Hopefully Univac and others will continue their research to make this technology commercially available at an early date.

Watching Job Trends

Programmers and systems analysts don't really need the U.S. Department of Labor to tell them that their jobs are changing and will continue to change over the next few years [CW, April 17].

But the labor agency's review of the occupational outlook for such DP workers should help to emphasize the changes that are occurring and alert programmers and analysts once again to the need to keep up with changes in technology and the marketplace that will affect their careers.

Although the analysis by the government agency is rather superficial, it does note the movement toward smaller computers in many applications, which will change the

way analysts and programmers work. It does not, however, discuss the probably longer lasting effects of moves toward structured programming and the like that attempt to make programming into more of an assembly line technique.

Both of these moves will have wide-ranging effects on the way DPs work and even on the type of people that might be attracted to the computer field over the next decade.

All programmers and analysts — as well as managers — would be well advised to keep current on the changes occurring in the industry in order to be in a position to take advantage of them as they happen.

Data Past

Five Years Ago April 25, 1973

TULSA, Okla. — Relying almost solely on previously secret IBM documents to prove its claim that IBM used monopolistic practices, Telex began its \$1.2 billion antitrust case against IBM here.

LOS ANGELES — County supervisors filed a civil suit in Superior Court here against Ampex Corp. seeking \$4.25 million in damages against the firm for not living up to an \$8.1 million contract to provide a sheriff's video-file system.

Eight Years Ago April 29, 1970

MONTREAL — Ten students were convicted of "conspiracy to obstruct

the use of a computer center" in the Feb. 11, 1969 burning of a DP center at Sir George Williams University. The students were acquitted of conspiracy charges relating to the destruction of the computer; if convicted, they could have received a sentence of life imprisonment.

The students had occupied the center for two weeks in a dispute growing out of a charge that a biology professor never gave black students grades higher than "C." When the police arrived on the last day of the occupation, students threw printouts, tapes, cards and small pieces of equipment out the windows. When the police tried to oust the students, a Control Data Corp. 3300 was smashed with axes and the center set on fire. The loss was estimated at \$1.6 million.



Letters to the Editor

Hardware Not to Blame

I must state my objection to the tone set in "Kentucky County Claims Multiple Benefit Without IBM 3270s" [CW, April 10].

I am not an IBM employee and never have been, but one cannot lay the blame for the Jefferson County fiasco on hardware.

My shop is currently running 65 IBM 3270 CRTs on-line to a 370/145 for nine hours a day. If our 145 goes down once a week, it is unusual and our CRTs literally never go down.

If Jefferson County has a problem, it was caused by uninformed users expecting the world from a DP department that is apparently inexperienced in on-line systems, data base design, telecommunications and user relations. I am forced to conjecture as to the situation there, but I must ask: Did the users really want to be automated or was it forced on them? Who "sold" Cars, IBM or the DP department? Was this the first on-line system? Was data base involved? Was adequate training provided for DP and the user?

I agree that IBM has marketed some "turkeys" in the past, but to blame the hardware and software is a little much and to categorize these problems as a "classic textbook case" is unforgivable. In today's technology, the only thing that is classic and textbook is the inept DP personnel who give the rest of us a bad name by their failures, or more politely, their lack of successes.

Paul J. Goldak
St. Louis, Mo.

They've Been Around

While I congratulate Cybertek Computer Products on the announcement of its new operating systems for Interdata, Inc. computers, I must chide Computerworld for choosing the headline

"Interdatas Get Multitasking" [March 27].

Interdata has offered multitasking operating systems for its product lines for many years. In 1970, RTOS was available for 16-bit users. It was superseded in 1976 by OS/16 MT2, an advanced multitasking environment for user applications written in Assembler, Fortran or Basic.

Interdata pioneered the era of the supermini with the introduction of the 7/32 in 1974. As early as January 1975, OS/32 provided a multitasking environment for Assembler and Fortran users. Today, Dynamic OS/32 MT, OS/32 MTM and the Interdata Transaction Controller provide a comprehensive set of operating environments. The event-driven, multitasking environment supports a variety of real-time applications. Time-sliced multiaccess is provided for interactive terminal users who can program in a variety of languages.

David J. Saunders
Product Manager, Software
Interdata Division
Perkin Elmer Corp.
Oceanport, N.J.

Price 'More Than Nominal'

"EFT Systems? No Thanks, Not Yet" [CW, Jan. 9] mentioned the availability of a newsletter, "Cabin," and the proceedings of a Dallas seminar. An address was provided.

I wrote to the office of the National Consumer Study of Electronic Funds Transfer in Washington, D.C., indicating an interest. The group responded with a request for a \$50 check for the seminar proceedings and an additional \$50 check for a subscription to the newsletter.

The article should have indicated the charge is more than nominal.

Arlan R. DeKock
Rolla, Mo.

Article Stresses Understanding Culture Gap Seen Between DPer and Users

By Jack Stone
Special to CW

Cultural differences between the DP department and user groups are important topics I always include in my lectures and DP management development programs.

Recently, my mail brought me a publication which did a superb job of bringing the subject into much sharper focus for me. Ronald S. Kintisch, president of Executive Services, Inc. of Abington, Pa., sent me a reprint of an article he co-authored with Marvin R. Weisbord of Block Petrella Associates, Inc. dealing with this cultural gap. "Getting Computer People and Users to Understand Each Other" appeared in the American Management Association's *Advanced Management Journal*, spring '77 issue.

Let me share its ideas with you.

The writers pointed out that the DP department/user schism is not really a new phenomenon. C.P. Snow, they noted, first raised the issue in his book *Two Cultures and the Scientific Revolution*. Snow expressed the belief that the attitudes, behavior and even the language of the scientist and the nonscientist are so different that in effect, they define separate cultures.

He went on to write: "Between these cultures is a dangerous gulf of mutual incomprehension. It is dangerous because the scientist is leading the revolution without much direction and understanding from the rest of us, perhaps creating a world

in which none of us would want to live." The statement well characterizes the situation in most computer centers today.

Kintisch and Weisbord echo Snow's sentiment: Business and government continue to live through a computer revolution mainly directed by computer people, not by management or by those who use computers... The computer people often do not understand the company's needs, and the users are alienated and resentful. Although there are exceptions, the specialists and users approach problems differently, use different languages and have different goals."

Goal Orientation

The writers then examined the cultural differences in more detail. First, they said, there are differences in goal orientation. "The computer specialist is interested in applying the latest computer technology to the problem at hand — to solving the problem in the most elegant way. He is the agent of change. The user wants the cheapest, simplest, most workable solution to a problem, not the most elegant. Change represents an added burden to him, and he may feel personally threatened by it."

Second, there are differences in time orientation, where the computer person works on development projects that are relatively long term. To a user, such projects

appear to be theoretical.

The third difference is the gulf in interpersonal orientation. It's not news that computer people tend to be problem-oriented and that users

The Human Connection

tend to be people-oriented.

Finally, there are differences in organizational structure. The usual computer department allows more freedom and less formality than the user department. The DPer is more project-oriented compared with the hierarchical structure in which the user lives. And the computer person's performance is difficult to measure as contrasted with the situation of the typical user, whose performance is often measured according to long-established standards.

Management Strategies

The writers did not advocate restructuring the cultures in order to get the users and computer people to work together. Instead, they suggested special management strategies are necessary to have them work as teams. Here is what they said on how to handle the culture clash.

• "The user and the computer specialist must both feel they have a great deal of influence over the team's decisions." This implies the

user should not only have an important say in making the decisions, but understanding the key issues, particularly the technical ones.

• "Team members should be at a level in their own organizations to have both the knowledge and the authority needed to make the best decisions." Unfortunately, most user teams are composed of individuals too low on the ladder. The user department's members often effectively abdicated their responsibility in the project, and the computer members take over.

• "The team should not be afraid to examine differences candidly and to resolve them through discussion." Of course, this rarely happens. People avoid conflict like the plague. In addition, to be effective and candid requires a large measure of self-confidence, substantial mental discipline and superior skills in dealing with people. (There aren't too many of these folks around.)

• "The time, goal and interpersonal orientation of the team leader should be midway between those of the computer specialist and the user. (And the same for the leader's organization.)" He must be viewed as independent of any point of view except project success.

• "The leader must command respect from the team by virtue of his knowledge and position." He should be not merely a mediator or coordinator, but in fact a real leader.

Recruiting Abuses Rumored

Readers See Some Dangers in Headhunting

Rumors about unethical practices of the recruiting industry have abounded for years. However, never having worked with a recruiting agency myself, I did not think about them much until readers wrote me suggesting there were more than minor abuses. As a result of mentioning this situation [CW, Feb. 27] I have received a number of informed descriptions of recruiting practices from inside the agencies, from customers of these agencies and from people who have been hired through them.

The situation can be dangerous. There are many cases of honest behavior, but no assurance can be given to the person being recruited through these agencies that details of his resume will be kept private. There are many occasions when, for one reason or another, material is not kept confidential, either at the time of recruiting, at the time of placing or subsequent to placement.

This is perhaps not surprising, because normally the person being recruited is not paying the agency.

Even if he is, the amount he pays is inconsequential compared with the amount some employers regularly pay for multiple placements.

Suggested solutions varied, but readers basically advised that if you have a large employer that dominates a particular recruiting agency, then don't go to it. Pick one that has less dangerous connections. Another suggestion is to disguise your connection with your current employer by using a coded name or other means.

Most of the danger springs from being blacklisted by the current employer, although on some occasions, it appears blacklisting can be done by a group of employers working in concert.

Employer Victims

Equally interesting, though, employers may also be victims. This comes about when the personnel department receives applications from, or leads to, worthwhile people other than through a favored agency. Different versions of this scheme work if these leads come directly to the personnel department or from a less favored agency.

The technique is to credit an agency with recruiting it did not do and see that it is paid by the firm. Usually, the agency, in one way or another, rewards the person giving

it the tip-off to go "recruit" an already-selected job applicant.

Another method is to have the agency put in a bill to the personnel department that is honored without the candidate or his technical management being aware of it.

This employer-victim situation seems to be prevalent in organizations that have frequent demands for hiring and rehiring.

In some cases, the scheme has apparently been detected, and a system of giving bonuses to employees of the firm who supply successful recruiting leads has reduced the number of candidates available for the false credit scheme.

However, the door is still wide open when a candidate replies to an advertisement, and the reduction in available targets does not translate into a reduction in manipulated referrals.

Still Valuable

It is interesting to notice that despite the abuses, no one has suggested the headhunters don't fill some useful purpose. None of the many writers gave any details, for instance, regarding headhunters falsifying the characteristics of an applicant more than in a comparatively minor way — and even then it appears it was done with the consent of the applicant.

Nor does there appear to be any general use of blacklists against any category or individual, except where these were originated by the firm that was the headhunters' best business contact.

It appears that firms' internal auditors should consider reviewing the controls over payments to headhunters, just as the people who want jobs should be aware that no matter what their own ethical standards are, they cannot guarantee the ethics of the headhunter. They should therefore proceed cautiously.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.



'Face It, Melmoth — Your Systems Just Aren't Integrated Anymore.'

The
Taylor
Report
By
Alan
Taylor
CDP

Battle Between Languages Merely Political

By Miles Benson

Special to CW

Languages can be status symbols. Remember the story about Ourownia, a programming language which turned out to be functionally identical to the Marketronics company's PL/PI and which existed only because a government agency wrapped its ego around having its own language?

If you found that story hard to believe, then you won't believe this one at all. Because this is the story of a competition between two such languages in a winner-take-all bat-

Sociology of Computing

tle.

And the battle — cross my heart and hope to Cobol — is taking place even as we speak.

For openers, we need to disguise the two programming languages. Let's call them Ourownia 3B and Ourownia 73. O3B and O73, for short.

Then let's disguise the ego-invested agencies. Let's say that O3B is the choice of the Division of Social Services (DSS) and O73 is the darling of the Division of Consumer Services (DCS). And let's assume that supervising these two divisions is the Cabinet-level Department of Public Concern (DPC).

Now, let's look at a little history. Ourownia is the generic name for

all languages defined by the DPC. DPC, aware that a proliferation of languages has occurred in its domain, is trying to slam the door on that problem by choosing one standard.

Getting that door shut is proving something of a dilemma. The political problems, arising from each Ourownia splinter group backing its own language, are horrendous.

But wait — DPC language specialists, aware they must solve the political problems first, have neatly finessed the politics and the inevitable confrontations by moving toward a new language, to be called Ourownia '80 (for 1980).

Whether Ourownia '80 is good or bad is irrelevant. What is relevant

is the reactions of people in DPC to this kind of change.

Back to the history. Ourownia '80 finessed the political problems for the DCS next-generation language, right? Except for one. How do you get there from here?

I mean, in 1980 the whole DCS world switches over, OK? But in the meantime, to make that event feasible, you have to stop the proliferation and even weed out a few of the bad guys.

Well, now we're back to our original story line. The target goal for DCS is to narrow the number of acceptable Ourownias to three. It's what the Ourownia '80 folks are calling the "interim list."

Throwing out the first half-down or so Ourownias proved easy. Picking the top two of the existing Ourownias wasn't bad, either.

It was when the time came to pick the No. 3 language that all political hail broke loose. Ourownia 3B and Ourownia 73 backers, sensing that supporters of the loser will no longer have anything to back, are flailing away at each other with all the might only a good political brawl can muster.

Sometimes I really wonder who represents Public Concern in the government. I mean, it's certainly not those who are pouring their energies into getting their programming language chosen as the standard.

Take a "for instance." The company where I work, Softpro Software, has a large contract with DPC. That job is being coded in Ourownia 73. Recently we were asked, under the terms of our contract, to evaluate the impact on cost and schedules of changing over to Ourownia 3B.

Well, the changeover wouldn't be cheap. Neither, in fact, was the evaluation. And every company doing work for DPC and using O73 or O3B, as I understand it, is being asked that same question.

In the political world, it's called "gathering data." In the lingo of the folks back home, it's "wasting money." The irony of it all is, of course, that both are right. But how do you avoid wasting money in a world of imperfect politics?

Actually, there is one other irony here. You may have noticed that nowhere in this story have I mentioned the technical capabilities of O3B and O73. I mean, one or the other must be a better language, right? Why not select the winner by a technical scoring process, instead of a political power play?

The answer to that is the saddest of all. There is no technical difference. Both of the impacted divisions agree O3B and O73 are both capable of doing the job.

The battle, if there is to be one, has to be fought on political lines.

Well, there you have it. Not one, but two (count 'em, two) duplicative languages, slugging it out to see which will be the third-string member of an interim list.

Sad as it may seem, computing folks can be just as dumb for the sake of politics as those in any other field!

Key to disc on Data General.

I doubt it.

Transaction processing on NOVA 3's.

Highly unlikely.

Both on one machine.

Never!

The product exists at
Data Communications Corporation.
And the proof is seeing our
Combined Processing System in action.

We sell **Unbelievable** systems.

Give us a call.

901-345-3544.

minicomputer division

DATA COMMUNICATIONS CORPORATION
3000 DIRECTORS ROW / MEMPHIS, TENNESSEE 38131

NOVA 3 is a trademark of Data General Corporation.

Character Design Also Backed IBM 3800 Gives Graphs With Reports

WHITE PLAINS, N.Y. — IBM has released a pair of Field-Developed Programs (FDP) designed to enhance the use of the company's 3800 printing subsystem under a variety of operating environments.

Business Graphing on the IBM 3800 is an assembler module that uses new functions to provide the capability to generate graphs at the same time reports are printed. The resulting graphs can present multiple plot lines with identifying text and references, a spokesman said.

The IBM 3800 Interactive Character Design FDP reportedly enables users working under a number of operating systems to simplify and shorten the extensive interactive process normally needed to create and debug standard or special characters and logs for the 3800.

The character set design logic can be used under the Time Sharing Option (TSO), the Virtual Machine Facility/Conversational Monitor System (VM/CMS), Virtual Storage/Personal Computing, OS/VS or

the Automated Text Management System II under OS/VS. A separate FDP is available for each of these environments, the spokesman noted.

User-Controlled Graphics

Under the Business Graphing FDP, the user controls the form and size of the graphic output. The graphs are printed a line at a time, starting at the top of the graphs, and both lines and text are created through a series of dots, 24 dots to the inch both horizontally and vertically, IBM

said.

The software operates as a subroutine to the user's program, which can be in Assembler, Cobol or PL/I. The subroutine is said to be system-independent, running under OS/VS1, SVS or MVS.

Listed by IBM as 5798 CRB, the package is available under license for \$225/mo for 12 months.

The Interactive Character Design FDP consists of several modules: a set of skeletal modules that provide the JCL needed to use the IEBIMAGE utility; a set of character design dot matrices formatted by pitch; and modules designed to create COPYMODS and character test programs.

Although there are separate FDPs for each user environment, each costs \$165/mo, which is waived after the billing of 12 consecutive months.

As with all FDPs, these are provided "as is" with central service provided only until Jan. 31, 1979. The service is limited to either "issue of corrected code or notice of availability of corrected code" when problems are reported.

'Infotrieve' Eases Use of Novas

IRVINE, Calif. — The Infotrieve and Infomat packages now available from Educational Data Systems were designed to give the non-DP-trained user an access route to the capabilities of the company's Iris operating system for Data General Corp. Novas.

Infotrieve, a CRT-oriented query system, operates on a wide range of file types including those with formatted, contiguous and indexed random organizations. The utility is said to be self-guiding in operation; it does not require any memorization of formats or protocols, a spokesman asserted.

Infotrieve includes subsystems for definition of files, creation and modification of records and protection of fields at the read/write level. The query capability allows the user to search the data base and identify segments that satisfy relationships of expressed interest, the spokesman said.

Records satisfying the user's criteria are displayed on a CRT or directed to a line printer for hard-copy output. If authorized, the user can also modify selected fields before they are displayed or printed, the spokesman noted.

Infomat is a general-purpose report writer that uses the selec-

tion facilities of Infotrieve but extends the formatting facilities of that package to meet virtually any user need, the vendor said.

All formats are designed interactively at the CRT with no need for conventional programming, the spokesman added.

Most of the expected capabilities are available including support for multiple control breaks and the accumulation and printing of subtotals and totals. Page headings, column headings, pag-

ination and other format niceties are also provided.

Once created, procedures for report generation can be stored and later invoked for repeated use, the spokesman noted.

Infotrieve costs \$2,000. Infomat by itself cost \$1,000, but because it requires Infotrieve to function, the total cost to a new user would be \$3,000. Educational Data Systems is at 1682 Langley Ave., Irvine, Calif. 92714.

'Focus' Set to Access IMS Data

NEW YORK — Information Builders, Inc. (IBI) has completed an interface between its proprietary information control system, Focus, and IBM's data base management system, IMS. The report generator features of Focus are now transparent to the IMS user, according to IBI.

Among the Focus facilities available to the interface user are graphics, financial modeling and statistical analysis subsystems and a nonprocedural report request language, a spokesman said.

Focus itself was developed to support both the DP professional and the novice. The focus report

request language uses simple English statements to screen, sort and format data; it also includes computational and logical facilities that exceed those of many programming languages, the spokesman claimed.

Shared Hierarchies

Creating and maintaining Focus files is done through a nonprocedural language. Various structures are available, the most complex providing multipath, shared hierarchies in which any segment can be viewed as the top of the file and any number of physically separate files can be logically interconnected, IBI said.

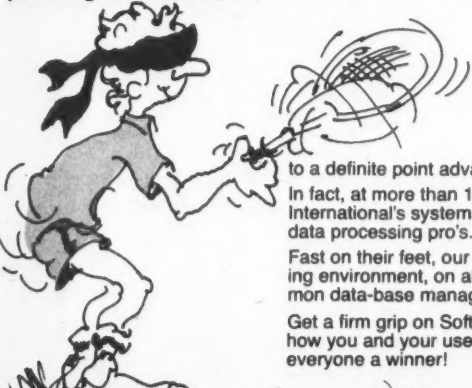
Focus was designed to run on IBM 370s including the Model 135 and Model 138 in batch or Time Sharing Option (TSO) mode under OS/VS, as well as in Conversational Monitor System (CMS) mode under IBM's Virtual Machine Facility (VM/370).

Available on Tymshare's remote computing network, Focus can be acquired for in-house use for \$39,000, with the IMS interface adding \$8,000 to the purchase price.

The Focus package and IMS interface can also be leased for \$1,175/mo, the company noted from 254 W. 31st St., New York, N.Y. 10001.

Get smashing net results.

Because net results count, we designed our LEDGER, RECEIVABLES, PAYABLES and our new ace FIXED ASSET SYSTEM for your users — the financial decision-makers. Our NET CHANGE MANUFACTURING system is the No. 1 star in material and capacity planning and control, too.

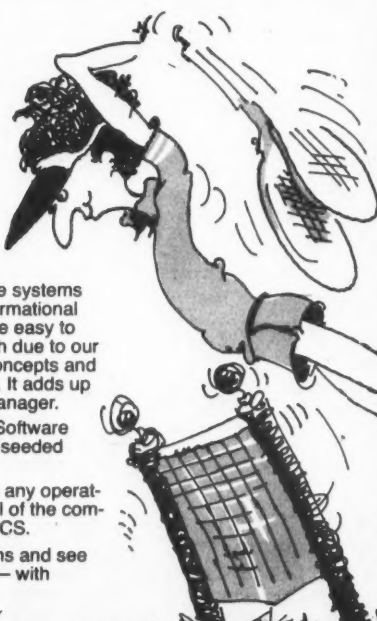


We serve flexible systems that remove informational blind-folds, yet are easy to install and live with due to our maintenance-free concepts and comprehensive warranty. It adds up to a definite point advantage for you, the EDP manager.

In fact, at more than 1,400 worldwide locations, Software International's systems are the choice of the top-seeded data processing pros.

Fast on their feet, our systems move smoothly in any operating environment, on all popular hardware, with all of the common data-base managers, even on-line under CICS.

Get a firm grip on Software International's systems and see how you and your users can have a love match — with everyone a winner!



I'm ready to receive, Software International. Please send me more information about:

SMALL COMPUTER SYSTEMS

for users of System/3 and other IBM, Burroughs, Univac 9030, Honeywell 62, HP 3000, DEC, Interdata and most popular business minicomputers.

- ☐ General Ledger and Financial Reporting
- ☐ Accounts Payable
- ☐ Accounts Receivable
- ☐ Fixed Asset Accounting

LARGE COMPUTER SYSTEMS —

for users of IBM, BURROUGHS, DEC, HONEYWELL, UNIVAC and ICL computers.

Financial

- ☐ General Ledger and Financial Reporting
- ☐ Accounts Payable
- ☐ Accounts Receivable
- ☐ Fixed Asset Accounting

Manufacturing

- ☐ Material Requirements Planning
- ☐ Master Production Scheduling
- ☐ Capacity Planning
- ☐ Shop Floor Control
- ☐ Purchasing

Comprehensive Report Generator

- ☐ FILETAB

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

PHONE _____

CITY _____ STATE _____ ZIP _____

COMPUTER SYSTEM _____

SOFTWARE INTERNATIONAL

2 Elm Square Andover, MA 01810 (617)475-5040

Atlanta • New York • Washington, D.C. • Philadelphia • Chicago • San Diego

Toronto • Houston • Columbus, OH • San Francisco

'MCS3000' Aids HP-Based Communications

E. LANSING, Mich. — A "major new release" of the transaction processing and network control program MCS3000 is now available from Systems Research, Inc. for use with Hewlett-Packard Co. HP 3000-II minicomputers, according to a spokesman.

MCS3000 ties the HP 3000 with one or more HP21MX-E front-end processors and system software to provide host-independent communications processing, including terminal handling, message prioritizing, message queuing,

transaction-based security and forms handling, he said.

With the use of the front-end design, all overhead associated with message processing is external to the HP 3000.

MCS3000 enables several communications protocols and terminal types to be used in combination. The software supports synchronous communications up to 19.2 kbit/sec and asynchronous work up to 9,600 bit/sec. Standard protocols include IBM's Bisynch, Burroughs' poll-select and HP's 264X page mode, the spokesman said.

MCS3000 is said to support a sustained data input rate of 30,000 char./sec on up to 208 point-to-point terminals, up to 40 multidrop lines or a combination of both. The system's store-and-forward capability allows it to interface with remote hosts such as IBM 360s or 370s, the spokesman said.

System functions include on-line network generation and status control over users, terminals and application programs. Also included is a Cobol program "skeleton" that includes all data areas to simplify application develop-

ment.

CRT display forms are created on-line regardless of terminal type. MCS3000 then "maps" appropriate forms mode control characters for each device type in the network.

A turnkey MCS3000 system including software and a single front-end processor is available for \$60,000. A dual front-end configuration costs \$125,000, Systems Research, Inc. said from 241 E. Saginaw, E. Lansing, Mich. 48823.

Interface Backs IBM 3, 370 Ties

MILWAUKEE — The Communications Interface Program from Medistat is said to maximize the interactive capabilities of any installation using both IBM 3 and 370 hardware, if IBM's IMS data base management system is available on the 370.

The package establishes on-line real-time communication between the IBM 3 and the host 370, permitting concurrent processing of local and remote data. It supports CRT-based inquiry and update, batch transmissions and report retrievals, a spokesman

said.

The increased flexibility provided by the interface is said to lead to a system that is a combination of centralized and decentralized processing, easing hardware upgrades and minimizing the impact often associated with changes in the corporate environment.

The interface is accomplished using IBM's Communication Control Program (CCP) on the 3 and the Intelligent Remote State Support component of IMS on the 370. Since the architecture of the 3 and the IBM System/34 are

similar, the software should work on the 34 as well, the spokesman added.

Written in Assembler and requiring 12K bytes of memory, the interface runs as a task under CCP and is CPU-active on a demand basis only, conserving resources on both satellite and host, he said.

Developed to enhance the use of Medistat's own data center here, the interface costs "about \$6,000" and can be ordered for immediate delivery from the company at 4115 N. Teutonia Ave., P.O. Box 459, Milwaukee, Wis. 53201.

MVS Time-Sharing Eased Under 'Tone 4'

GARDEN GROVE, Calif. — An MVS version of the Tone 3 time-sharing support package currently available for IBM OS/VS1 will be ready for release in July, according to the vendor, Tone Software Co.

The new product, Tone 4 MVS, provides the user with all the capabilities of standard IBM Time-Sharing Option (TSO) but with a significant reduction in memory and access time requirements, a Tone spokesman claimed.

Tone users may, through terminal commands, create and edit data sets, submit jobs and scan output; and interactively compile, link edit and execute programs and utilities. Working in this mode, users save paper costs since hard copy is avoided until it is needed, the spokesman noted.

Tone 3 — and presumably its successor — is a completely virtual system, without any page fixing. The modules are completely reentrant to minimize working set page counts.

Tone supports IBM 3270s, 2740s and a range of other terminal units. Enhanced 3270 support is said to include informational screen formatting and prompting, 133-character "logical windowing" and instant interrupt capability.

The system runs on CPUs ranging from IBM 370/135s with 384K memory to a 370/168 with 3M bytes of memory, the spokesman said.

Orders for Tone 4 MVS are being accepted for deliveries starting July 1. The enhanced software costs \$500/mo, Tone said from 11588 Trask Ave., Garden Grove, Calif. 92643.

WITH DOCS USE YOUR 3277 AS A DOS-DOS/VS CONSOLE!

DOCS—Display Operator Console Support—provides the IBM S/360 & S/370 DOS and DOS/VS user with 3277 display unit SYSLOG support. DOCS is simply installed on any DOS or DOS/VS system with no changes required by the user. All 1052, 3210 and 3215 typewriter functions are supported by DOCS with numerous enhancements over a non-DOCS environment. DOCS also enhances DOS/VS operation on S/370, 138, 148 and 158 beyond that provided by the IBM program product. DOCS is quickly and simply installed on any system. All that the user need do is catalog the DOCS distribution tape to his Core Image library, define where the DOCS hard copy file is to be located and execute DOCS. Total installation time required is under 10 minutes. DOCS functions concurrently with EDOS, GRASP, DOS/MVT, DOS/RS, POWER II, ASAP, POWER/VS, and ITEL's DOS/VS executing on a S/360 and will enhance the system operation by providing improved facilities for the use of these packages while DOCS is controlling SYSLOG. DOCS is currently used in over 250 installations world-wide including diverse businesses and US Army bases. DOCS is available from CFS, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for \$175.00, \$1,890.00 and \$5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

SPEED

DOCS provides significant through-put improvement by the very nature of the speed of the 3277 display unit alone. Operators can even pre-answer messages on the console.

MULTIPLE CONSOLES

DOCS allows from 1 to 16 3277 display unit consoles to be used simultaneously as SYSLOG devices.

MULTIPLE OUTSTANDING REPLIES

DOCS permits messages followed by Reads to the typewriter to remain unanswered without tying up the system. All outstanding Reads are shown in high intensity on the display console(s).

REDUCED SUPERVISOR SIZE & OVERHEAD

DOCS does away with any need for the Console Buffering option in DOS or DOS/VS thus providing a savings in the core required by the users' supervisor as well as greatly reducing significant overhead to the entire system. Experience has shown that total through-put improvement with DOCS installed may approach 10% to 20%.

ELIMINATES DEPENDENCY ON TYPEWRITER

DOCS will continue to operate, and allow the entire system to operate, if the 1052, 3210 and 3215 typewriter becomes inoperable. DOCS spools all typewriter data to a hard copy disk file for later printing thus obviating the need for the typewriter to be on-line at all times. Hard copy is asynchronously provided if the 1052, 3210 and 3215 is available. A hard copy listing is also available through a utility program which the user may execute in any problem program partition to list the hard copy file on SYSLSST.

NO USER PARTITION REQUIREMENT

DOCS executes in its own pseudo-partition thus allowing the user unrestricted use of the problem program partitions.

MULTIPLE EXTERNAL INTERRUPT KEYS

DOCS provides a separate External Interrupt key for each partition (replacing the use of the MSG command). This is especially convenient for EDOS users. This function is also useful for GRASP users when communicating with a background partition problem program. A unique interrupt key is provided for each DOS/MVT region.

100 Million Dollar Club

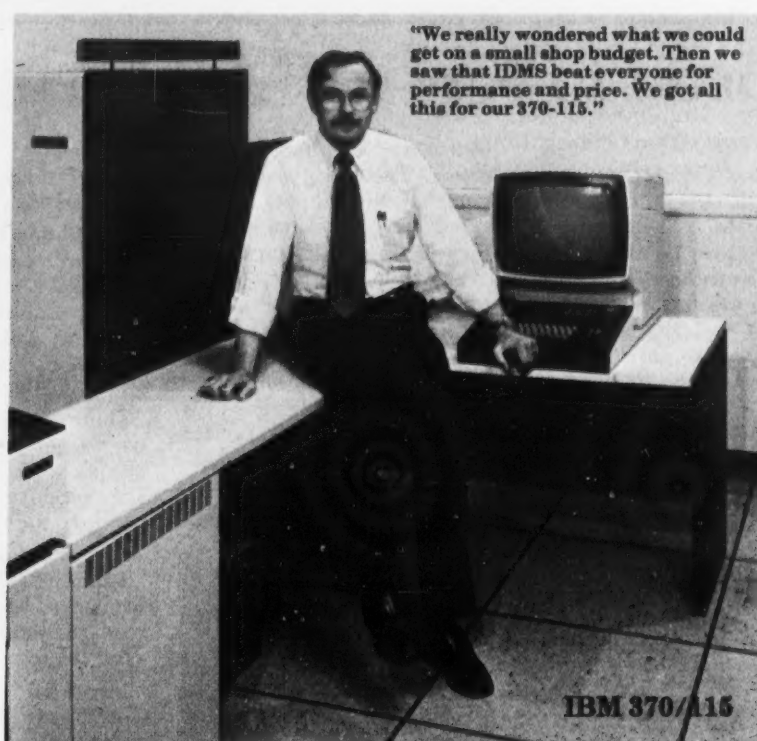
Send requests for DOCS to CFS. License agreements along with detailed information will be sent by return mail. Inquiries may be directed to:



Mr. Richard Goran
CFS, Inc., 1330 Boylston Street, Suite 608
Chestnut Hill, Massachusetts 02167
(617) 566-0222 Telex 94-0285



- tremendous flexibility and ease of use
- warm restart and automatic recovery
- full-featured integrated data dictionary
- high level language query
- program independence
- minimum resource consumption
- upward-downward compatibility
- high performance
- full-featured report generator
- integrated telecommunications support with any TP monitor
- data independence
- guaranteed recovery
- integrated on-line and batch processing
- thorough on-site education
- complete, comprehensible documentation
- outstanding vendor support
- rapid installation
- secondary indexing and sequential processing
- database administration utilities
- multi-threading



- tremendous flexibility and ease of use
- warm restart and automatic recovery
- full-featured integrated data dictionary
- high level language query
- program independence
- minimum resource consumption
- upward-downward compatibility
- high performance
- full-featured report generator
- integrated telecommunications support with any TP monitor
- data independence
- guaranteed recovery
- integrated on-line and batch processing
- thorough on-site education
- complete, comprehensible documentation
- outstanding vendor support
- rapid installation
- secondary indexing and sequential processing
- database administration utilities
- multi-threading

That's right. Both get the same great system with IDMS.

Most people think that IDMS is best for large system users. That's true, IDMS is the best DBMS for large systems.

But some people believe that IDMS is too sophisticated and therefore not appropriate for small system users. These people couldn't be more mistaken — because IDMS is the one DBMS that easily provides big budget performance for all size budgets.

Not only that, when small and medium-size users are ready to upgrade their hardware, IDMS actually makes this transition easier, maintaining the same flexibility, ease of use, and performance.

Flexibility, performance and price, the three most important reasons why IDMS is perfect for the small computer, perfect for the large, perfect for every computer in between.

Proof? Let us go over with you the list of features above as well as your own checklist of requirements — for whatever size com-

puter. We're convinced that once you've seen what IDMS can do, you'll make it your DBMS. For further information, send this coupon or phone (617) 237-6600.

- | | |
|---|----------------------------------|
| <input type="checkbox"/> Have a representative call. | Name _____ Title _____ |
| <input type="checkbox"/> Send me complete technical information on IDMS. | Organization _____ |
| <input type="checkbox"/> Send a schedule of free IDMS seminars being held in my area. | Address _____ |
| | City _____ State _____ Zip _____ |
| | Phone _____ |
| | Computer Model _____ |

IDMS. The DBMS for all computers.



Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

Nucon to Key on Management

NEW ORLEANS — "Management of DP" is the focus of the NCR Users Conference (Nucon) to be held April 30 through May 3 at the Fairmount Hotel here.

Keynoting the general management sessions will be Ira M. Hayes, an assistant vice-president of NCR, who will speak about "Keeping Pace With Tomorrow." Others on the agenda include *Compu-*

terworld columnist Jack Stone, discussing the importance of the human connection in DP, and consultant James F. Townsen, focusing on "Why Managers Fail."

Benjamin R.W. Knowles of Brandon Systems, Institute, Inc. is scheduled to lead a trio of sessions dealing with planning. "User Application System Planning" will be followed by "How to Develop a

Long-Range DP Plan" and then "Pitfalls in Long-Range DP Planning."

In addition to general management presentations, the conference will feature programs addressed to users of Criterion and Century CPUs and NCR's smaller X99 system.

There will also be talks about user-developed and installed applications programs, terminal products and software services, the firm noted.

A special four-hour seminar, "Structured Programming for Management," will be held on the afternoon of May 3, just after the regular conference.

Interested users who have not already registered can do so at the conference, which carries a fee of \$150. Addi-

'MTX-11' Drives Micros

WALNUT CREEK, Calif. — A multitasking executive for Digital Equipment Corp. PDP-11 minicomputers and LSI-11 microcomputers, MTX-11 from Virtual Systems, Inc. (VSI) throughput and efficiency, a VSI spokesman claimed.

MTX-11 executes multiple tasks on an interleaved basis, he said, with user-set priorities determining what to execute if competition exists for the CPU or other resources.

Rapid response times and high data throughput make the software a "most attractive enhancement" for systems in real-time process control, data acquisition and data communications environments, the spokesman asserted. MTX-11 is also the "ideal foundation" for time-sharing and general-purpose operating systems, he said.

Costing \$1,395 plus \$100 per CPU, the package is a member of the Microbench family of programs for micro-computer applications development. VSI is at Suite 406, 1500 Newell Ave., Walnut Creek, Calif. 94596.

LOCATE MINICOMPUTER SOFTWARE

—NOW TWO VOLUMES—

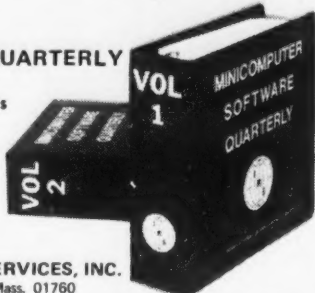
MINICOMPUTER SOFTWARE QUARTERLY

WITH

•Over 500 detailed program descriptions
•Indexed by: Application —
Hardware — Language

Subscription Includes:

Base Volume Set + 4 up-dates
\$85. US/Can (+5% Tax in Mass.)
\$110. Foreign (prepaid only)



INTERNATIONAL MANAGEMENT SERVICES, INC.
215 Oak Street, Dept. C, Natick, Mass. 01760

Programmer/Analysts Impressive New Applications!

Established NYC service bureau organization specializing in unique Industry Application Packages featuring On-Line Systems under DOS & DOS/VS has several positions immediately available. Excellent ground floor opportunities. Expand your applications capabilities and broaden your base including Systems Generation and On-Line Communications Development as well as assisting in the development of new industry packages.

Should be self-sufficient, aggressive individuals requiring minimal supervision with a strong IBM COBOL background. Minimum 3 years exp. with good communicative skills. Some background in On-Line Systems, WESTI and/or ADPAC is desirable, not essential.

An excellent compensation package plus an unusually attractive benefit/medical plan is offered.

No travel required. No agency calls, please.

John Ruane, Director
Systems & Programming



(212) 964-4646
PCS DATA PROCESSING, INC.
140 Cedar Street, New York, N.Y. 10006

an equal opportunity employer (m/f)

Dictionary Enhanced

DENVILLE, N.J. — Level 3 of the HSI Data Dictionary package from Haverly Systems, Inc. (HSI), developed for use with DMS/1100 Level 6 data bases on Univac 1100 hardware, is said to help data base administrators manage all data and programs in their in-

stallations, even if they are not under the data base system. Unique features of the enhanced software are the schema and program analyzers that "greatly facilitate" the entry of data into the dictionary, according to HSI.

The analyzers read the user's production or test schema or programs and capture desired data directly.

The HSI Data Dictionary uses DMS/1100 as its own data base handler to support descriptions of data base structures and cross-references to programs using them.

The base HSI Data Dictionary costs \$14,300; the fully extended version, \$22,000. A minimum six-month lease costs \$785/mo, the vendor said from 76 Broadway, Den-

ville, N.J. 07834.

Package Aids Use of PDS

HOUSTON — Gulf Computer Sciences, Inc. has an enhanced release of its Partitioned Libraries Management System (PLMS)

PLMS was designed to support the use of partitioned data sets (PDS) in an IBM OS or OS/VS environment with, for example, a tape dump/restore facility that allows retrieval of dumped material by member and not necessarily by whole data set.

While it is supportive of the programmer, however, PLMS also includes various audit facilities so PDS can be restored right up to the point of a system problem, a spokeswoman noted.

PLMS II extends member Update control beyond the linkage editor and IEBUPDTE to such functions as Copy, Rename, Catalog, Uncatalog and Scratch, while retaining full backup and audit capabilities for these functions, Gulf said.

PLMS II supports expanded member passwords including passwords assigned by the user. The package also enables the restriction of installation-specified utilities which, uncontrolled, would have the ability to modify PLMS-controlled libraries, the spokeswoman claimed.

PLMS II costs \$8,000 and is available from Gulf Computer Sciences, Suite 160, 1775 St. James Place, Houston, Texas 77056.

CAI Backed on PDP-11

PHILADELPHIA — A computer-assisted instruction (CAI) package for any Digital Equipment Corp. PDP-11 minicomputer or LSI-11 microprocessor has been introduced by Advanced Interactive Systems (AIS).

Called Avid, the package permits students to ask questions in colloquial English, directing the system to a lesson or portion of a lesson.

Student Records

Avid also has facilities for response-contingent presentation of textual and graphics information for student record management and for the controlled administration of examinations, AIS noted.

Single-user systems including a graphics CRT cost upward of \$12,000; four-user systems start at \$24,000, AIS said from 8216 Pickering St., Philadelphia, Pa. 19150.

3033 PROCESSOR

- Walk away leases
- Your delivery position or ours in 1978

Comdisco Financial Services, Inc. has arranged over \$200 million in financial leases.

COMDISCO
312-698-3000

COMPUTER INDUSTRY ACQUISITIONS

Multi-Client Study
For Proposal Call:

IDC
INTERNATIONAL DATA CORP.
214 THIRD AVENUE
WALTHAM, MASS. 02154
1-800-225-8952

DISPLA

Machine and Device Independent Graphics Software

For Information Call Or Write:

ISOCO

Integrated Software Systems Corporation

4188 Sorrento Valley Blvd., Suite G,
San Diego, CA 92121 (714) 483-6178

Available Immediately For
SHORT TERM LEASE
370/138 370/148 370/145
3330's and OEM 3330's
360/30 360/40 360/50 360/65's
Greyhound Phoenix ICA's
CALL US COLLECT

United States		
Austin	Ron Geil	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dave Hyland	(415) 283-8980
International		
Canada	Don Maunder (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 61-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818
Non-IBM:		
UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818



**GREYHOUND
COMPUTER CORPORATION**
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

DP Dialogue

Advertisement

Notes and observations from IBM
that may prove of interest to
data processing professionals



SDLC at Seibels, Bruce: Flexibility and Economy

The property and liability insurance business of Seibels, Bruce & Company is conducted through more than 300 online terminals — one for every two professional employees. Underwriters, claims adjusters, investment managers, and others in many locations all access a common data base, resident on an IBM System/370 Model 168 at company headquarters in Columbia, South Carolina.

The Seibels, Bruce network grew from 32 local terminals to 300 units across the continent in a period of two years. The company attributes sharp rises in productivity to the computer system. "Operating expenses used to be 34 percent of premiums," explains G. Larry Wilson, senior vice president. "Now they are down to 28 percent. Using terminals, some of our underwriters have experienced work output gains as high as two to one, while an increase of 25 percent is typical.

Why SDLC?

"The extremely rapid growth of our network," Wilson notes, "was our reason for looking at SDLC." Synchronous Data Link Control (SDLC) is an advanced line control discipline for communication between terminals and a computer. It is a key element of Systems Network Architecture, IBM's most advanced telecommunications technology.

"SDLC accommodates a dynamic network," Wilson says. "We can add terminals or replace one type with another without adding telephone lines. We can

put as many as 62 visual display terminals—more than twice as many as before—on a single line.

"The architecture permitted us to phase in SDLC one line at a time. The Network Control Program in our 3705 Communications Controller took over such functions as polling and error recovery on SDLC lines, freeing capacity in our 370/168. The 3705 can accomplish an error recovery on one line while the rest of the system continues to work normally."

Consistent Response

Response time of the system to terminal inputs, Wilson reports, was significantly improved by SDLC. "But even more important is the greatly reduced variation in response — within three seconds more than 90 percent of the time. Users work more easily and make fewer errors when the system responds consistently.

"One additional benefit relates to our data communication link via satellite to other sites. There is a propagation delay through a satellite that can be troublesome under the older line disciplines, but SDLC tolerates it without any difficulty."

Minimizing the number of leased telephone lines has also held down the required number of modems and other line-terminating equipment, Wilson points out. Today's network costs the company no more to operate than did the considerably smaller configuration, a year and a half earlier.

Seibels, Bruce uses one visual display station for every two professional employees. Synchronous Data Link Control lets the company add or replace terminals easily, without adding telephone lines.

Who's Zoo: A Social Register for Animals

One American zoo needed a Celebes ape not long ago. Another needed an echidna (or spiny anteater). A computer helped each identify a zoo with a surplus of the desired animal.

The American Association of Zoological Parks and Aquariums, in conjunction with Federal agencies and private foundations, sponsors a project that some day will store data on every animal in every zoo in most countries of the world. The association's International Species Inventory System (ISIS), headquartered at the Minnesota Zoological Garden, Apple Valley, has already placed in an IBM computer detailed information on 25,000 mammals and 10,000 birds located in zoos in the United States, Canada, and Europe. ISIS will someday also include data on reptiles, amphibians, and fish.

A Vital Task

Says Janice M. Olsen, systems manager of ISIS: "A vital task of modern zoos is to develop and maintain self-

sustaining populations of captive wild species and—in certain cases—to provide the only reservoir of species on the verge of extinction. To do this, we must collect data and share it.

"ISIS tells us the captive numbers and reproductive rates of animals on the endangered species list, such as the Indian rhinoceros, Siberian tiger and orangutan. This information aids the development of breeding management programs for captive wild animals."

Finding Rare Mates

Another valuable service of ISIS—the acronym spells the name of the Egyptian goddess of motherhood and protection—is the finding of a mate for a rare species in a zoo that does not have one of each sex. The computer, which is an IBM System/370 Model 158 in the state data processing center in St. Paul, Minnesota, helps to match animals needing mates with available candidates, to the benefit of the rare species themselves and of zoos all around the world.



The International Species Inventory System (ISIS), a computer data base of animals in zoos, is helping endangered species like this Siberian tiger.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
DATA PROCESSING DIVISION

Net Offering 'Librarian'

WOODBURY, N.Y. — The Librarian source program management system from Applied Data Research, Inc. (ADR) is now available on Calldata Systems, Inc.'s TS RJE/Batch remote computing service.

The Librarian supports storage of source programs, test data and job control language statements on disk, including the commands needed to alter stored material in a variety of ways and in an orderly and annotated manner.

The advantages of The Librarian fall into two basic areas, according to Calldata. Programmer benefits include fast, efficient updating, detection of grammatical and key-punching errors and support for a scan facility, enabling the user to

search for any given string of characters.

Benefits accruing to management are said to include a summary report of the status and attributes of all programs under Librarian control; documentation including a record of specific changes made in individual programs; and job stream generation.

While using The Librarian on the Calldata network supports other work by the user in that environment, it may also provide a means of testing the package prior to acquiring it from ADR.

The Calldata service is available nationwide. The network is headquartered at 20 Crossways Park North, Woodbury, N.Y. 11797.

Utility and Its IMS Interface Ease Insurer's Operations

LOS ANGELES — Occidental Life of California, a subsidiary of Transamerica, is rapidly altering its IMS data base structure to more easily accommodate a vast and growing appetite for facts and figures, according to two auditors.

Dick Ryan, assistant general auditor, and Gary Hill, senior DP auditor, use a pair of IBM 370/168s under MVS. In addition to DYL-260 and the DYL-IMS/DL1 interface from Dylakor Software Systems, Inc., the Occidental system utilizes IBM's IMS Advanced Life Insurance System (Alis) and Pan-sophic System, Inc.'s Panvalet.

Extensive on-line facilities have been established tying corporate headquar-

ters here to sites in other cities.

One of the first major applications for the DYL-260 report writer/utility package was the processing of complex, variable-length Alis files. The master file for the life insurance portion of this system normally resides in a six-reel file. DYL-260 was put to work extracting pertinent data and condensing it to one reel of tape.

The Dylakor system is also utilized for production of reports taken from the new "minimaster". One is a quarterly run of stratification of annualized premiums by year of issue and an historical file of lapsed policies.

DYL-260 has become extremely important to the auditors at Occidental. With the advent of a data base system, they found data retrieval time escalating, desired records increasingly difficult to pinpoint and special reports taking longer to develop.

In addition to the Alis routine and the generating of various production audit reports via DYL-260, the auditors made the move toward the package for data base accessing procedures using the optional DYL-IMS/DL1 interface.

The Occidental auditors extract entire segments from the IMS data base and create their own fixed-length files. From these selected and highly manageable segments, they utilize pertinent data to produce quick reports requested by management.

This method boosts responsiveness and vastly improves cost-effectiveness, according to Ryan.

Training System Aids DP Auditor

WOODLAND HILLS, Calif. — Audics, a self-study package on internal control of financial systems, is aimed at DP auditors, according to its vendor, Info 3.

Audics provides training in the basics of developing DP systems, preparing systems for acceptance testing by auditors and incorporating internal financial controls within an organization, a spokesman said.

The package contains audiocassette tapes, workbooks, case studies, forms for controlling the system development process, a tape recorder and locking briefcase.

Audics costs \$595 from Info 3 at Suite 193, 21241 Ventura Blvd., Woodland Hills, Calif. 91364.

If you've reached that certain level of equipment and professional sophistication in the 'DP game', you are probably looking beyond IBM for your more specialized software needs.

And if one of those needs is for a teleprocessing monitor, you should look to Informatics.

Not only are we the largest independent software vendor in the world, we're also the Number One independent supplier of TP monitors. And as the recognized leader, we offer MONITOR IV™, a product line of super-efficient, cost-effective teleprocessing systems oriented toward different user needs and requirements.

For smaller DOS and DOS/VS users who want to get on-line fast, we have MINICOMM — a powerful, flexible system that installs easily, takes minimal main storage, and doesn't require hardware upgrades.

For DOS and DOS/VS users who want the ultimate in flexibility, there's BETACOMM — a fully queued, multithreaded system that provides multitasking for application programs as well as the monitor. A

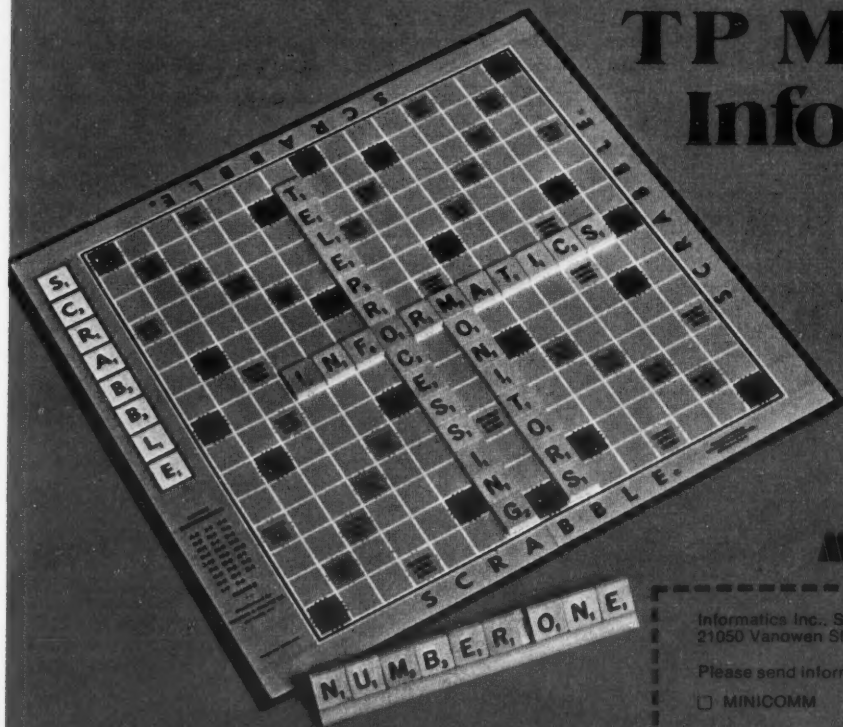
comprehensive file handler supports all standard access modes and popular data base systems.

INTERCOMM, for OS and OS/VS users, is the most sophisticated teleprocessing system available anywhere. Its many advanced features include device-independent support for over 30 terminal types, comprehensive error recovery with integrated checkpoint, message, queue, file, and data base recovery, plus a unique program-isolating feature.

Naturally, all of our MONITOR IV™ products have the full technical and educational support of the over 1,800-person Informatics team around the country and around the world. Our reputation among our more than 300 TP monitor customers is the envy of the software industry and we intend to keep it that way!

So remember... when you spell out your TP monitor needs, don't settle for the three-letter word. Think Informatics... the last word.

When it comes to
TP Monitors,
Informatics
is the
last
word.



MONITOR IV

informatics inc. Software Products

World's Leading Independent Supplier of Software Products

Informatics Inc., Software Products, Dept. D977
21050 Vanowen St., Canoga Park, California 91304

Please send information on:

☐ MINICOMM ☐ BETACOMM ☐ INTERCOMM

Name _____

Title _____

Company _____

Address _____ Tel. _____

City _____ State _____ Zip _____

Computer _____ Operating System _____

SCRABBLE is the registered trademark of Selchow & Righter Company for its line of word games and entertainment services.

COMPUTER TERMINALS

DECwriter II	.....\$1,495
DECwriter III	..... 2,895
DECprinter I	..... 2,495
VT52 DECscope	... 1,695
VT55 DECscope	... 2,695
TI 745 Portable	... 1,875
TI 765 Bubble Mem.	2,995
TI 810 RO Printer	.. 2,295
ADM 3A CRT	..... 875
ADDS Regent 100	.. 1,325
Data Prod. 2230	... 7,900
QUME Ltr. Qual. Ptr.	3,295
FlexiFile 21, FI.Disk	1,995

FULL OWNERSHIP, RENTAL AND LEASE PLANS AVAILABLE ON ABOVE AND OTHER EQUIPMENT



TRANSET
CORPORATION

2005 Route 22, Union, N.J. 07083
201-688-7800

THE CHOICE IS YOURS
TERMINALS FROM TRANSET

Where are the leading users of successful DB/DC Systems today?

Where are the leading users of successful DB/IS Systems today?

April 23-26th

CINCOM KNOCK-ABOUT /78 AGENDA

At-a-Glance

GENERAL SESSION

ENVIRON/1 COBOL-XT Environment	Distributed Processing In The New	On-line Documentation Systems	Management Attitudes	New User Orientation	Industry Report On Data Base Users	A Look Inside The DBA Toolbox	EDP Auditing Of A Data Base Environment	New Customer Orientation Session
	10 Basic Techniques To Enhance DP-Oriented Documentation	When Does Data Become A DBA Responsibility	An On-line Accounting Package Using ENVIRON/1 And TOTAL	TOTAL Software Exchange	From No DP Department To On-line In One Year	On-line System Design	Teamwork: A Clickie Or Management Tool	
Educational Opportunities From Cincom	Training Users For On-line Systems	Performance Criteria For On-line Systems	The Keys To Success In Data Processing Are Planning & Involvement	Backup/ Recovery In An ENVIRON/1, TOTAL Environment	Evaluating Mini-Computer Alternatives With TOTAL	Control Of A Large, Centralized Data Base	System/3 TOTAL In An On-line Environment	
	TOTAL 8.0	Management Awareness	Guidelines For A Successful First Year	Interactive Distributed Processing	TOTAL In A Manufacturing Environment	Accounts Payable System: Product Overview	Manufacturing Materials Planning System Application Software	User Experience With TOTAL 8.0

Cincom Systems' Knock-About... first formed in 1970 by Cincom and its user group... has truly become the premier forum for the exchange of information between successful implementors of data base/data communications

discussions on subjects of common interest. Presentations on the trends and directions in the software industry will be included in the 3-day seminar. Cincom will present a major new version of TOTAL, along with a new on-line query facility, enhancements to other products, and detailed information on innovative new product developments. Clearly, the emphasis is on practical solutions to real world problems, contributed by experienced professionals from our resource of installers worldwide.

at Knock-About 78. If your organization has not contacted Cincom Systems in the past, this is a success story in time for presentation.

Growth in Use of Pascal Called Revolutionary

By Richard J. Cichelli

Special to CW

There is a revolution occurring in programming languages and its leaders are programmers like you and me. Mainframe and system vendors are worried and sometimes hostile toward us because of our interest in the revolution.

The thing that has caught our interest is the "do-it-yourself" language Pascal. It's been around for about 10 years, but of the more than 65 different implementations now available, not one has vendor support. Yet implementations and use of Pascal are skyrocketing.

There are Pascal compilers for the Zilog, Inc. Z80 micro to the Cray Research, Inc. Cray-1 supercomputer

and for nearly everything in between. Most of the compilers are available from "underground" user groups whose members continuously polish and improve their systems.

The language was designed in 1968 by Niklaus Wirth of Eidgenossische-Technische Hochschule (ETH) in Zurich, Switzerland. It combines power, simplicity, machine independence and security. It has excellent facilities for structured programming and data structuring.

Compiler Development

It wasn't until 1970 that the first Pascal compiler came into existence. Urs Ammann (also of ETH) implemented Pascal for the Control Data Corp. CDC 6000 and 7000 machines. Am-

mann wrote the compiler in Pascal and bootstrapped it by hand translation. The result was a small (4,500 lines of Pascal) core resident, extremely fast compiler that proved ideal for systems work and teaching.

The Zurich compiler has gone through several generations. The current version makes use of all the library facilities on CDC machines and runs compatibly under all of CDC's many operating systems. The Pascal 6000 compiler outperforms CDC's Fortran, Cobol and Algol compilers.

Compatibility and performance are the areas in which Pascal beats vendor-supplied compilers for standard languages. CDC seems to have accepted this fact and now markets a front-end communications system (the CDC

2550) for which the software is written entirely in Pascal.

Other vendors are learning of Pascal's power and efficiency. Recent benchmarking on Digital Equipment Corp. hardware showed Seved Torstendahl's PDP-11 Pascal compiler (free!) produced tasks that were 80 times more efficient than the code produced by DEC's Cobol compiler for the same DP applications.

The one-year-old Pascal Special Interest Group within the DEC Users Society (Decus) now numbers 400 members. Some of them are producing an optimized compiler for Pascal that runs under all PDP-11 operating systems and hardware configurations. It also runs under the highly acclaimed Unix operating system developed by Bell Labs for the DEC environment.

Operating Systems for PDP-11s

Several operating systems for PDP-11s have been written entirely in Pascal. Prof. Ken Bowles of the University of California at San Diego has a system that runs on LSI-11s and supports graphics. It is a complete stand-alone single-user interactive educational and business system and it is available.

IBM users are also discovering Pascal. The Australian Atomic Energy Commission distributes its OS-compatible compiler for \$A100. This compiler was adapted from one developed for the Hiatachi Ltd. computer by T. Hikita of the University of Tokyo. It outperforms the PL/I Optimizing Compiler six to one on compile speed and produces code that is much faster and much smaller as well. Many users characterized Pascal as "PL/I done right."

You can join the 2,000 members of the Pascal underground by sending \$4 to the Pascal User's Group (PUG), c/o Andy Mickel, University Computer Center, 227 Experimental Engineering Building, University of Minnesota, Minneapolis, Minn. 55455.

This will make you a member of PUG and will get you four issues of *Pascal News* a year.

The Decus Pascal SIG can be reached through John R. Barr — 377/C209, Hughes Aircraft Co., Box 92919, Los Angeles, Calif. 90009.

Cichelli is research manager of computer applications for the American Newspaper Publishers Association/-Research Institute and an adjunct lecturer in the graduate school of Lehigh University, where he has used Pascal for courses in advanced programming techniques and compiler writing.

Is your system well tuned? SARA will make it hum.

SARA (Systems Analysis and Resource Accounting) is the most efficient and cost-effective diagnostic tool you can use to keep your system at peak performance. It lets you take a critical look at your entire configuration... and pinpoint potential problem areas. Try SARA now, for 30 days, and find out just what shape your system is in. Mail the coupon today or, for immediate consultation, call (703) 821-6275 or (800) 336-0135 (toll free).

Boeing Computer Services Company

7700 Leesburg Pike, Suite 201 • Falls Church, VA 22041

☐ Tell me more about your 30 day trial.

☐ Send more information about SARA. My system is

☐ IBM ☐ Univac

☐ Honeywell ☐ CDC

☐ other (please specify) _____

Name _____ Title _____

Organization _____ Phone _____

Type of Activity/Industry _____

Address _____

City/State/Zip _____

The best reason to go outside.

BCS

BOEING COMPUTER SERVICES COMPANY

A Division of The Boeing Company

On-line
key entry
for
CICS users!

See page 8 in the Special Report section for details.



Your in-basket holds more than paper

It seems like everyone sends you requests for reports of computerized data. They sure pile up fast. But you know that behind every one of those requests is a decisionmaker whose job effectiveness rests on being able to make his decisions from information . . . which you can provide.

Does he get it on time? Every time?

If not, EASYTRIEVE can help you do away with the mountain of requests. To get information back to that decisionmaker in record time.

EASYTRIEVE is the free form information retrieval system that works with simple English key words. The system does the formatting, the page-numbering, report dating. It is load-and-go. It is simple to learn and apply, yet can be the basis for entire job accounting systems, modeling and financial systems, auditor programs . . . the list is endless.

EASYTRIEVE, the Datapro Honor Roll software system in-use at over 1,500 IBM 360/370 data centers around the world. From the people at Pansophic. Offices near you throughout the world.

PANSOPHIC

709 Enterprise Drive, Oak Brook, IL 60521

800-323-7335



Business Schools Providing More DP Exposure

More than 100,000 people graduate each year from U.S. schools of business. A 1977 survey by the University of New Hampshire revealed that 94% of all accredited schools now require computer proficiency of undergraduates. Over 80% of accredited M.B.A. programs have such a requirement.

Graduates of these schools are permeating the managerial ranks in industry and government. The computer requirement has been in existence long enough so that many of these gradu-

ates have reached middle management.

What do these students learn about computing and management information systems? The survey was taken by Jane Clark, computer consultant at the Whittemore School of Business and Economics. This column provides a summary of the report on that survey, published in the October and November issues of *Computing Newsletter for Schools of Business* (University of Colorado, Colorado Springs, Col. 80907).

Clark's survey did not include questions to determine computer content of the overall curriculum. My 1974 survey of accredited schools revealed that the majority had implemented four phases of computer curriculum:

- Coverage of computer fundamentals, system analysis/design and programming through a course required of all students early in their academic program.

- Coverage of the applications of computers through incorporation of this material into the functional area courses, e.g., computer applications in finance in the finance courses, computer applications in marketing in the marketing courses.

- Coverage of computer capabilities for abetting decision making in a dynamic business environment through computer-oriented business games.

- Coverage of integration and optimization of computer applications through a course on design and implementation of a sophisticated, computer-based management information system.

In all four phases of the computer curriculum, students deal directly with the computer — preparing input and evaluating output.

In Phase I, however, students learn to program. In 1967, when I wrote the book *Computers and the Schools of Business*, few schools required the course of all students. There were elective courses offered to seniors and second-year M.B.A.'s. The objective was to show the usefulness of the computer in business organizations.

That objective remains. However, an additional objective has been derived. Students are taught to program the computer so they can use it in their own educational process. With this capability, students can be assigned non-trivial kinds of problems to solve.

Phase II of the four-phase computer curriculum is coverage of the applications of the computer. Unlike Phase I,

this is not accomplished by adding a course to the required curriculum. In the early 1960s, some schools had such a course.

A course of this type is not practical; it is also unsound from a pedagogical standpoint. There are more than 1,700 business applications of the computer. Which ones should be taught in a course covering applications?

It is much sounder pedagogically to teach the applications of the computer by incorporating that material in the existing functional area courses.

Phase II of the four-phase computer curriculum is taught at two levels. Students learn about the fundamental applications in the core courses. The advanced applications are taught when students move into their major fields.

To perform in-depth analysis in his/her major field, the student is taught about the computer applications for analysis.

To understand the information systems used in his/her field, the student usually is assigned a project requiring access to a data base.

To understand the use of computer-based models used in his/her field, the student gains practice in decision making through computer simulation.

Integrating Applications

Phases III and IV teach students the value of integrating applications into a computer-based management information system. Through participation in computer-based business games, they learn how models can be built for evaluation of alternative decision possibilities. Through the final course they learn how management information is generated through the data base approach.

This dramatic change in education of potential managers is beginning to have significant impact on business and industry. In a few years, these computer-literate graduates will begin to reach top management levels. It will be exciting to see the changes in computer use that occur.

Couger is professor of computer and management science at the University of Colorado.

J. Daniel Couger
On
Education

Business Systems

DISTRIBUTOR OPPORTUNITY

Micro Business Applications, Inc., manufacturers of the MICRON™ computer systems is actively seeking distributorship candidates with prior successful experience in supporting the data processing needs of the business community.

MICRON systems are the affordable answer to the data processing requirements of small to medium-sized companies. The microprocessor based hard-disc system was developed by MBA to provide the first time computer user with a usable solution to today's problems, while expandable to meet tomorrow's requirements.

For further information, please call or write: Warren Blossom, Vice President/Marketing.

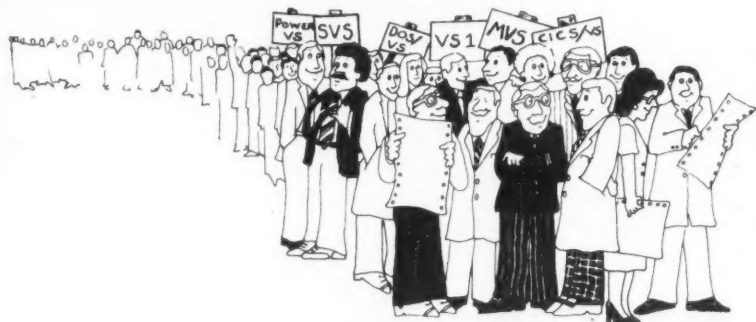
Micro Business Applications



11588 Sorrento Valley Rd.
San Diego, Ca. 92121
(714) 453-8884

Look Into Johnson Systems'

CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM



"Now, a powerful data collection system that lets you accurately account for . . . and equitably bill for . . . all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Phone (____) _____

Computer _____ Operating System _____

**Johnson
Systems, Inc.**

8400 Westpark Drive
McLean, Virginia 22101 (703) 893-8700

C424

UCS Net Adds 'Topman' For Tracking of Projects

KANSAS CITY, Mo. — Topman, a project tracking system, is available to sites in more than 150 cities in the U.S., Canada and Europe served by the United Computing Systems, Inc. (UCS) Uninet communications network.

Developed to provide management with the tools needed for the planning, evaluation, resource monitoring and replanning of a given project, the Topman system combines established tracking techniques such as line of balance, critical path method and Gantt chart display in a single, easily operated system, UCS said.

As a planning aid, Topman can be invaluable to the project manager in determining the flow, sequence and interdependencies of all activities, identification of critical path, time estimates, slack time adjustments and project relative to the initial plan, a spokesman claimed. Topman provides graphical

reports such as cumulative graphs and cost schedule status reports by individual resource category, he added.

Topman provides a variety of detailed reports to meet the requirements of each management level. The management groups identify the type of information needed, and the coding necessary to call out the report is incorporated into Topman's data base. The system lends visibility to the cost, scheduling and progress of each division and subdivision of the work to be accomplished, the spokesman said.

UCS customers use specialized, toll-free telephone circuits to gain access to the data communications network connecting U.S., Canadian and European cities with major computer centers in Kansas City, Mo.; Boston, Ma.; and London, England.

The company is at 2525 Washington, Kansas City, Mo. 64108.

Distributes Data Base

CA Architecture Backs Varied Protocols

IRVINE, Calif. — A network architecture that is said to eliminate system boundaries on intranetwork communications and concurrently support most major communications protocols has been introduced by Computer Automation, Inc.

Called the Syfa Virtual Network "because the location and function of any and all elements of the network are totally transparent to the user," the architecture concurrently

supports IBM's Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC), CCITT X.25 and bisynchronous protocols, CA said.

The architecture allows the user to geographically distribute a data base but retain the ability to directly access any data base from any Syfa "information station" in the network, a spokesman noted.

The user can operate under any of the ma-

for protocols or configure a network that requires concurrent utilization of all three, he added. The Virtual Network architecture reportedly allows an unlimited number of processors, terminals and on-line mass storage units to be configured in an integrated telecommunications network.

With the Virtual Network capacity and flexibility, the user can proceed with network implementation "without fear of being made obsolete by changes in industry standards beyond his control," CA claimed.

Users presently committed to IBM's bisynchronous protocols can mix IBM 2780, 3780 and Hasp/20 batch protocols with interactive multidrop IBM 3270 protocol, the company said.

Implementation of SNA is supported using CA's recently announced support of SNA through IBM 3790 communications emulation and SDLC protocol.

By supporting X.25 protocol, the Virtual Network can optionally be interfaced to public packet-switching networks.

Besides configuring Syfa terminals and processors into the network, the user can interface such equipment as IBM 3270 terminal clusters, IBM 3790 (SNA/SDLC) systems, Bell System Dataspeed 40/4 clusters and X.25-compatible processors and devices, CA said. This means users can attach their existing terminal equipment to a Syfa Virtual Network and select the most cost-effective equipment for each application and each geographic location, according to the spokesman.

One or more host mainframes can be interfaced to the Virtual Network at various

(Continued on Page 28)

Bank Running in Bisync Links IBM 3600s With System/3

By Ronald A. Frank
CW Staff

VANCOUVER, Wash. — First Federal Savings and Loan Association here has combined IBM 3600 finance terminals with a communications-oriented IBM System/3.

The 3604 and 3611 finance terminals communicate in Binary Synchronous mode at 1,200 bit/sec over private lines to a System/3 Model 15. The processor uses the Communications Control Program (CCP) to oversee the terminal network, which operates in six bank locations.

A full-blown implementation of the 3600 terminals with Synchronous Data Link Control (SDLC) and a 370 Systems Network Architecture (SNA) environment would have been too much capability, according to Dan Myers, DP manager. The System/3 with a 160K of CPU storage can serve teller operations and allows for upgrades that will soon include a loan accounting system on IBM 3270 CRTs and administrative work, he said.

The CCP teleprocessing software operates with an on-line terminal program developed by two programmers at First Federal. The program is available from IBM as non-supported software for other savings and loan associations with similar terminal requirements, Myers noted.

The First Federal Network is believed to be one of the first in which the 3600 finance terminals are linked with a System/3 under Binary Synchronous protocol, IBM indicated.

Quicker Transactions

"With our computerized communications system, we can provide our more than 25,000 customers with the convenience of fast and accurate savings and loan transactions," according to John Priel, president of First Federal. "Before installing the system, customers making deposits, withdrawals, loan payments or transferring funds between accounts would have to wait while the

teller looked up their records and then hand-posted the transaction.

"Now each teller has a terminal," he explained. "He merely keys in the account number and the customer's record appears on a CRT screen. The teller then enters the amount and the transaction is recorded on the screen.

"Once the teller verifies the transaction, it automatically becomes part of the account record, and the customer receives a computer-printed receipt. That's all there is to it, and it only takes a matter of seconds," he said.

If a customer has a question about his account, the teller can give an immediate response because he has the latest information at his fingertips. "And we've eliminated the risk of misplacing loan payment cards and deposit/withdrawal slips because these records are handled only once — at the teller window," Priel pointed out.

Telenet Plans Uniform Rates

WASHINGTON, D.C. — Telenet Communications Corp. will initiate uniform nationwide pricing for its public data network on July 1.

With this proposed tariff structure, still subject to approval by the Federal Communications Commission, Telenet would become the first U.S. common carrier to offer data communications service at rates that are independent of distance and user location throughout the continental U.S.

The rates for dedicated access will range from \$300/mo for 50- to 300 bit/sec transmission to \$1,100/mo for 9,600 bit/sec. The charge will include a port at a Telenet switching center, the access line and the necessary modems or digital interface units.

Terminal users who dial into the network for a connection to a remote computer will pay a flat rate of \$3.25/hour in all cities directly served by the network, Telenet said.

Previously, hourly public dial-in rates ranged from \$1.80 to \$5.80 depending on individual city rate categories and the speed of the service. The \$3.25 rate will apply for both 110- to 300 bit/sec and 1,200 bit/sec access.

Telenet has also announced plans to provide In-Wats service for 1,200 bit/sec terminals in addition to its In-Wats service for terminals communicating at lower speeds. Both In-Wats services will be priced at \$15/hour.

For customers with a high concentration of usage in a particular city, Telenet has also filed rates for a service called the Private Packet Exchange (PPX). PPX will enable a customer to buy a group of ports as an alternative to a private concentrator or public dial-in service, a spokesman said.

The service will feature the automatic switching of overflow calls to public dial ports, he added.

COMMUNICATIONS



Available
Immediately

RENT IT TODAY!!

DECWRITER II or III

World's Most Popular
New Terminals

- **QUICK DELIVERY . . .**
We ship in ONE DAY from Our Large Stock
- **MONTH-TO-MONTH LEASES . . .**
Don't Invest Your Dollars when You can Use Ours

- **BRAND NEW . . .**
New Terminals — Checked & Ready to Go
- **SUPPORT . . .**
All Options plus DEC Maintenance Available

FROM THE DECWRITER SPECIALISTS

We are an affiliate of AMERICAN USED COMPUTER CORPORATION — World's Largest Dealer in Used "DEC" Equipment

AMERICAN TERMINAL LEASING • 617-261-1100

P.O. Box 68, Kenmore Station, Boston, Mass. 02215 An Affiliate of AMERICAN USED COMPUTER CORPORATION

THE \$99⁰⁰ MODEM*



You're suspicious aren't you? OK, we confess. Our M-1 asynchronous short haul modem won't do what a lot of other modems will do.

However, the M-1 will solve many of your local or in-house communication problems up to 10 miles or 9600 bps. And because you aren't paying for a lot of options and capabilities that you don't need in those situations, you'll be saving a bundle of money.

Interested? Write or call us now for a data sheet and complete price information.

bo-sherrel co.

36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

*100 Quantity

"Towns you've probably never heard of" are now key locations in major data communication networks. And they're big in using terminals in many local applications.

That's why Trendata expanded its nation wide service facilities to cover places such as Victoria, Texas. Any data communications terminal manufacturer could have shipped a system there. We backed up a recent Victoria installation with a full training and service program.

We like towns like Dublin, Georgia because we offer everything from a system for wide flexibility and high production to a single reliable machine for limited applications. We handle the purchase, lease or rental program to keep it simple. And we

provide peripherals and supplies to avoid further complications.

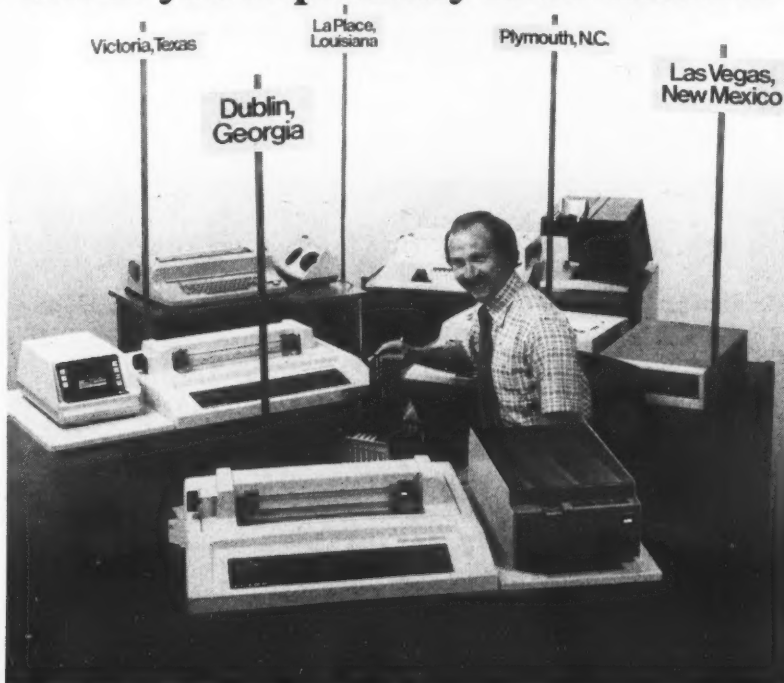
Trendata communication terminals are designed to be as reliable and trouble-free as possible, but when you do need service, our factory trained serviceman will be there in a matter of hours... because we realize that downtime on a system in Las Vegas, New Mexico can be just as costly as one in New York City.



**Applied Magnetics
Trendata**

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

**Our service reaches
towns you've probably never heard of**



Maker of Phototypesetters Brings Out Smart Terminal

By Ronald A. Frank
CW Staff

WILMINGTON, Mass. — Compu-graphics Corp. has used technology developed for its DP phototypesetting systems in an intelligent CRT terminal.

Called the Mini Disk Terminal 400 (MDT-400), the microprocessor-controlled device can be used for data entry, text editing and other distributed DP applications, the firm said.

The terminal includes a keyboard/CRT, minidiskette, microprocessor unit and communications interface in a desktop configuration. Offering asynchronous and binary synchronous communications interfaces for line speeds up to 9,600 bit/sec, it was designed for larger users prepared to provide the necessary software support, the company said.

A text-processing package has been developed as the first applications software available from the vendor.

The MDT-400 includes a 8-bit Zilog, Inc. Z80 MPU with 32K bytes of storage as well as an additional 87K bytes of diskette storage. Users can write applications programs using the Program Development Facility which supports Assembler and high-level languages.

A file management capability allows data to be transferred to and from disk storage. Single keystrokes can be used for preprogrammed control keys.

Each of the 122 keys on the MDT-400 can be programmed and keyboard configurations can be loaded from the diskette. Eighteen user-

defined keys can be changed by an operator.

The terminal includes cursor control, scrolling, intensity blink, reverse video and underline capabilities.

The Model 401 includes 8K bytes of random-access memory (RAM) a minidiskette, CRT and keyboard for \$4,275; the Model 402 provides 16K bytes of RAM and costs \$4,500; and the 60 char./sec MDT-441 matrix printer costs \$2,495. Monthly maintenance is \$50.

First deliveries are scheduled for November, Compugraphics said from 80 Industrial Way, Wilmington, Mass. 01887.

Azurdata Cuts Scorepad Prices

RICHLAND, Wash. — Azurdata, Inc. has reduced the prices of its Scorepad terminals by as much as 35%, according to a spokesman.

Scorepad is a microprocessor-driven, upgradable terminal that is said to complement the recently introduced Scorepad LC. Scorepad's solid-state memory is expandable to 88K characters and it is available with bar code scanning for Plessey, Codabar and Universal Product Code labels.

The basic price for Scorepad has been reduced from \$1,350 to \$1,200 and all options and configurations have been reduced as well. Azurdata is at P.O. Box 926, Richland, Wash. 99352.

CA Syfa Gains Architecture

(Continued from Page 27)

hierarchical levels. Any mainframe which supports SNA (3790), X.25 or bisynchronous communications can be interfaced.

Additional Elements

Most of the elements necessary for implementing the Virtual Network were incorporated in the earlier Syfa design, including the operating system, programming language, file management system, computer architecture and instruction set, CA said. However, Virtual Network does require additional elements.

Control of the total Virtual Network is vested in the Virtual Network Controller based on a version of CA's LSI 4/90 processor. The Virtual Network Controller is the "traffic cop" for intranetwork communications.

Each Syfa system will contain a microcomputer-based Distributed Data Base Processor, using X.25 protocol, to serve as an interface between the Syfa CPU and the Virtual Network.

Each Virtual Network Controller interconnects up to 31 Syfa processors and 992 Syfa terminals to geographically distributed data bases, with a capacity of up to 74.4 billion bytes of on-line storage. Access to all mainframe data bases is also provided.

Since multiple Virtual Networks can be interconnected, the total number of terminals, processors and on-line storage capacity which can be configured is unlimited, the company claimed.

With Virtual Network, every user

has all of the resources of the entire network "at his fingertips," the spokesman said. Each terminal user on any Syfa processor can access any data file on any disk in the network. The transparency in this case is at the file management level, he noted.

"The terminal user neither knows nor cares where the actual data bases reside," he pointed out.

The basic price for a single Syfa system ranges from \$29,000 to more than \$150,000. The additional cost to configure a Virtual Network includes \$31,500 for the Virtual Network Controller and \$7,500 for each Distributed Data Base Processor. An optional backup network controller is priced at \$20,000.

The Virtual Network Controller controls 15 Syfa systems, but each controller can be expanded in increments of four to accommodate an additional 16 systems. Each incremental addition costs \$4,000. A 31-system Virtual Network Controller therefore sells for \$47,500.

All necessary control software and operating systems are included in these prices, CA said. Communications emulators carry a one-time charge for the entire network and range in price from \$1,500 to \$7,500.

All Virtual Network components are field-installable making it possible for current Syfa users to upgrade to the networking approach.

First deliveries of the architecture's components are scheduled for the third quarter, CA said from 18651 Von Karman, Irvine, Calif. 92713.

Mailgram System Provides One-Day Service

McLEAN, Va. — Western Union (WU) Electronic Mail, Inc. was formed as a wholly owned subsidiary of Western Union Telegraph Corp. to meet a growing need for one-day mail preparation and delivery at competitive cost. The stored Mailgram system includes the installation of 1,200 terminals in user locations to speed the preparation of messages.

WU's goal with the stored Mailgram system was to take the idea of one-day mail delivery a step further and actually cut the cost of normal mail preparation. To do this, a combination of microprocessor-based terminal functions and CPU-assisted functions were utilized.

The user gains access to the WU service by dialing a toll-free 800 number. After call origination, the Mailgram terminal, supplied by Digi-Log Systems, Inc. is used to generate messages by a combination of on-line and off-line functions. The messages are generated by entering and editing new information from the keyboard or by "constructing" messages through the addition of variables to a standard text stored in the WU CPU.

Two Standard Modes

For simple operation, the network functions had to be largely invisible to the user. The terminal vendor met this requirement by providing multifunction, microprocessor-controlled terminal workstations.

The Mailgram terminal has two standard operating modes: Mailgram mode and general mode. It is switch-convertible to a general Ascii terminal.

The multiuse terminal feature cuts the entry level to the stored Mailgram system greatly, according to Al Tala-

mantes, vice-president and general manager of Western Union Electronic Mail Co.

One of the first things a new Mailgram terminal user would do is create a user data base of standard messages and address lists. These are stored in Western Union Electronic Mail CPUs for later reference and use.

Each item is identified by a five-digit reference number. As is the case in later message preparation and distribution operations, the user message and address data base is keyed on the Mailgram terminal for direct entry into the WU.

Typical Operation

In a typical message preparation operation, a message and the desired ad-

dress would be entered into the display area of the electronic mail terminal in accordance with format rules. After completion of the off-line function, the WU toll-free 800 number is dialed.

On connection to the computer, the terminal keyboard is automatically locked and the WU DP center here in McLean automatically verifies the user terminal's identification number. If the number is valid, the input message is pulled from the terminal.

The stored Mailgram processors (a mix of Interdata, Inc. and Univac equipment) check the message for format errors and signal message acceptance or rejection to the operator. If accepted, a message log number is displayed in a special protected area on the right-hand side of the screen. After

correction, the operator reenters the message and the cycle continues until the message is accepted and a log number is assigned.

Addresses can be keyed or selected from the user address data base, which can be broken down in up to 99 different ways for fast reference without rekeying.

Once a message is keyed, the WU Electronic Mail System takes over, starting with the Interdata and Univac equipment at McLean. Interconnection to the WU Electronic Mail Network is controlled by WU's Info Master large-scale switch. It then proceeds through the WU land and satellite network to the receiving post office, where the message is printed for morning delivery.

We can help you get a better share of the timesharing market.

If you're operating a batch service bureau, adding an on-line capability will help you add new customers.

If you already provide a remote computing service, an effective, lower-cost system will get more customers switching to you.

Or if you're just starting a computer services company, getting the right computer will really get you started off right.

The one computer that can best help you take advantage of all the opportunities in the timesharing market is the computer made by us.

We're Basic Timesharing Inc.—the one computer manufacturer with first-hand experience of the computer services business. It's enabled us to develop a computer uniquely right for your business: the BTI 4000 System.

The BTI 4000 gives you the total management capabilities vital to your wide-ranging business. You can put real computer power in your customers' hands; keep full control in yours.

A BTI 4000 gives you hierarchal account organization, for more effective administration of your system resources. Access and use is tightly controlled by you at all levels—from individual user, to group, to master account. And the BTI 4000's sophisticated internal accounting facilities enable you to accurately track use, so you can fully invoice customers.

These special features give you the added advantage of actually "sub-letting" segments of your system. User accounts—over 5000 of them—can be grouped into completely independent organizations. So you can earn income without overhead, and without losing control.

Direct control of your BTI 4000 system is never farther away than the nearest phone, giving you complete supervision capabilities.

You get more system availability with a BTI 4000, too. Because all software housekeeping can be performed with users still on-line.

The BTI 4000 uses BASIC-X, an unusually powerful extension of the BASIC user language, enhanced for business programming.

You can have a ready-to-go system with 10 megabytes of storage, magnetic tape cartridge drive and 8 ports, all for just \$35,950.

There's room to grow, too, because the BTI 4000 is modularly expandable. Add disk storage to 400 megabytes; increase user capacity to 32 ports; add peripherals like industry-compatible magnetic tape and line printers.

Additionally, there's proven applications software available to you. A complete bureau accounting package, file management system, data base manager, and packages for accounting, inventory control, and more.

And we offer around-the-clock, on-line support for all your systems, no matter where they are.

The BTI 4000. To help you get a better share of the timeshare business. Get the complete details today.

Tel-Tex Renting Model 43 KSR

HOUSTON — Teletype Corp.'s Model 43 keyboard send/receive (KSR) matrix terminal is now available for rent or lease through the Tel-Tex, Inc. leasing and rental program.

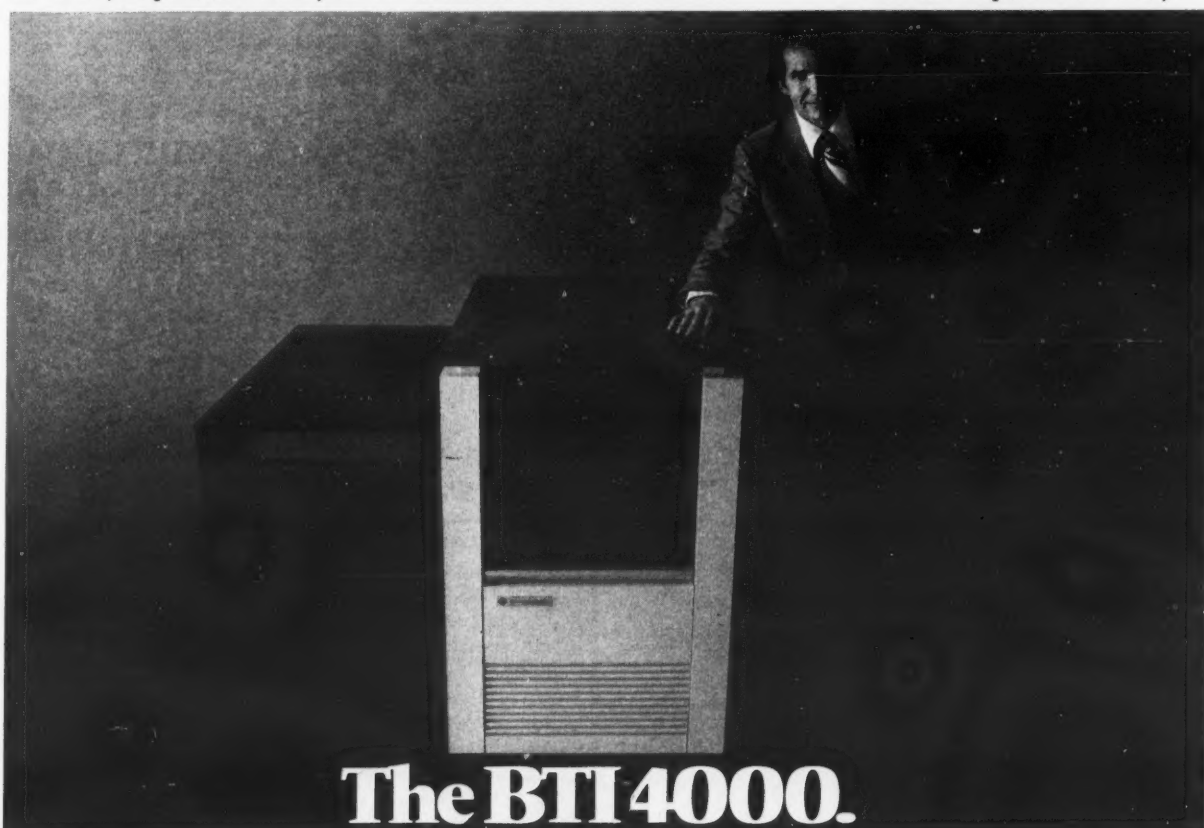
A data set model will be available later this year, according to the firm.

The RS-232 Model 43 rents for \$64/mo on a 12-month plan. The TTL version rents for \$49/mo.

Maintenance is available through 45 Teletype Service Centers nationally or on a depot basis to Tel-Tex.

Tel-Tex is at 3203 Audley St., Houston, Texas 77098.

THE CHOICE IS YOURS	COMPUTER TERMINALS	
	100% EQUITY RENTAL PLAN	
	DECwriter II	\$ 75 mo.
	DECwriter III	\$145 mo.
	DECprinter I	\$125 mo.
	VT52 DECscope	\$ 85 mo.
	VT55 DECscope	\$137 mo.
	TI745 Portable	\$ 94 mo.
	TI 765 Bubble Mem.	\$152 mo.
	TI 810 RO Printer	\$117 mo.
TERMINALS FROM TRANSNET	FULL OWNERSHIP AFTER 24 MONTHS	
	PURCHASE AND OTHER LEASE AND RENTAL PLANS AVAILABLE	
	SIMILAR PLANS FOR OTHER PRODUCTS	
	ADM3A CRT	\$ 45 mo.
	ADD5 Regent 100	\$ 67 mo.
	DATA PROD. 2230	\$395 mo.
	QUME Ltr. Qual. Ptr.	\$168 mo.
	FlexiFile 21, Fl. Disk	\$102 mo.
	TRANSET CORPORATION	
	201-588-7800	
	2005 Route 22, Union, N.J. 07093	



The BTI 4000.

Basic Timesharing Inc., 870 W. Maude Ave., Sunnyvale, CA 94086. Sales Offices: East: Cherry Hill, NJ (609) 662-1122; Midwest: Minneapolis, MN (612) 854-1122; Chicago, IL (312) 298-1177; South: Dallas, TX (214) 630-2431; West: Sunnyvale, CA (408) 733-1122; Anaheim, CA (714) 533-7161

Range of Standard Features Marks GE Printers

WAYNESBORO, Va. — General Electric Co. has introduced a matrix printer line with a number of features as standard equipment.

The Terminet 200 matrix models are available in both an interactive and line printer version. The interactive 1,200 bit/sec keyboard send/receive (KSR) unit is mated with a receive-only (RO) configuration that can be modified into a line printer with minimal hardware changes, according to the firm.

The Terminet 200 printers reportedly include servo control for both carriage and pa-

per advance, 20 in./sec slew rate, a 1K buffer, multipart forms printing, 136-column print positions with variable operator-selectable character spacing, selectable vertical spacing, bidirectional printing (line printer only), vernier tractor adjustment for fine tuning paper and the ability to handle paper widths from 2 in. to 16-1/2 in.

Featuring straight wires, ballistic firing and a laminated core for reduced heat, the operator-replaceable print head has a 7 by 9 matrix for both single and multiform usage, the firm added.

As an option, a nonvolatile semiconductor memory module can be added to the KSR/RO versions to provide more efficient and versatile forms handling. A multichannel, 128-position vertical format unit, which is both keyboard and remote source programmable, is included with this feature as is horizontal tabbing and an 85-character answerback, a spokesman said.

A self-test feature is available through a test button on the line printer that generates a preset test pattern.

The keyboard, available in either Ansi or Ecma standard layouts, has Hall effect switches and is similar to the Terminet 30 and 1232 keyboards, GE said.

KSR electronic options include data set control and line control. The line printer is microprocessor-based, allowing a variety of interfaces.

Terminet 200 peripherals include paper tape (pedestal required), a stand-alone magnetic tape terminal and a diskette storage terminal.

Transmission rates of the teleprinter are serial asynchro-

nous at 110-, 200-, 300- and 1,200 bit/sec, full- or half-duplex. The standard interface for transmitted or received data includes EIA levels or 20 and 60 mA current loop (strappable). The optional data set control includes circuit call indication for the data set, GE said.

The Terminet 200 is designed as a desktop unit with an optional pedestal.

The printer costs about \$3,000 from the GE Data Communication Products Business Department, Waynesboro, Va. 22980.

For Sale

\$299.00 each

(in quantity)

Numeric Data Entry Batch Communication Terminals

Over 300 available (used)

Call Toll Free 800-323-2288

in Illinois 312-279-1960



Limited-Distance Modem Offers System and Self-Test Diagnostics

FORT WASHINGTON, Pa. — Tele-Dynamics has introduced a limited-distance modem that provides data communications over unloaded private cable systems or over telephone company-supplied local exchange loops and features diagnostic capabilities for both system tests and self-test.

The Model 7300 modem provides full-duplex or half-duplex operation over four-wire lines or simplex operation over two-wire lines at rates of 19,200-, 14,400-, 9,600-, 7,200-, 4,800-, 3,600-, 2,400- and 1,800 bit/sec. Diagnostic features include analog and digital loop-back, command loop-back and a built-in test pattern generator, according to the company. Overall performance is monitored by six LEDs.

The 7300 meets the power vs. frequency specifications of Bell Systems Publication 43401 for private-line metallic circuits, the spokesman said. A compromise transversal equalizer offsets transmission effects of the cable and further extends the range. A typical range is 17 miles at 2,400 bit/sec using No. 22 wire.

Synchronization is achieved by means of a sync pattern transmitted before the data and clear-to-send lines are

enabled, the firm said. The receiver is data blind until this sync pattern is received. The carrier is detected by means of a digital technique instead of the usual amplitude sensing method, so that line noise does

not affect carrier detection, the spokesman said.

The Model 7300 sells for \$695 from the Tele-Dynamics Division of Ambac Industries, Inc., Fort Washington, Pa. 19034.

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION
9112 Gaither Road
Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

**WE'RE
MOVING
UP IN THE
WORLD!**

**SPECIFICALLY
SPEAKING, TO THE
TOP OF TROY
OFFICE TOWER
IN TROY,
MICHIGAN.**

Effective Monday, April 17th., 1978, CMI Corporation will begin operations from its new International Headquarters in Troy, Michigan.

Write for our new Annual Report and discover why CMI's steady financial growth and aggressive marketing techniques have made them the nation's largest privately held third party IBM dealer.

CMI CORPORATION

Top of Troy, W. Big Beaver & I-75,
Troy, Michigan 48064. (313) 362-1000.

CMI
CORPORATION

The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000



Coupler Operates At 1,200 Bit/Sec

PHOENIX — Omnitec Data Corp. has announced the Model 1200B acoustic coupler that incorporates LSI technology.

Designed to operate with a high-speed printer over dial-up lines as well as transmission rate-selectable CRTs, this unit allows for time-sharing and other remote computer access in nonpermanent environments, the firm said.

The unit sells for \$975 from 2405 S. 20th St., Phoenix, Ariz. 85034.

Computer dealers: your opportunity to handle the AJ System 1500 Business Computer.

The AJ System 1500 is now available for exclusive distribution in certain areas. We can offer you an outstanding package:

- A simple, easy-to-use system—fully expandable to a multi-station system with a range of peripherals.
- A wide range of business application software packages at no cost.
- Comprehensive client accounting software packages, also at no cost.
- AJ field service support in key cities.
- Good margins.

- Exclusive territories.
- Complete training program.
- Advertising and promotional support.
- The AJ reputation for quality and dependability as one of the world's leading manufacturers of data communications equipment.

If you'd like to learn more about this opportunity, call or write C. L. (Chuck) Gordon, Computer System Division, Anderson Jacobson, Inc., 521 Charcot Avenue, San Jose, California 95131, (408) 263-8520.



**ANDERSON
JACOBSON**

HP Develops Terminals To Support Manufacturers

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a terminal designed for use in manufacturing operations. The Model 3070B reportedly offers facilities to enter information into an HP 1000 mainframe and can also act as the central controller and data collection center for a number of interconnected programmable instruments, according to the firm.

The 3070B can read standard Type 3 Hollerith badges and marked or punched cards. It has a keyboard for local numeric entries, a 15-char. LED display and a 50 line/min 20-character-wide alphanumeric strip printer, the firm said.

The 3070B also offers the user 15 prompting lights and 10 program-definable keys.

In use, the terminal's prompting lights might be programmed on an associated HP 1000 into a prompted sequence such as "Insert Badge," "Enter Work Order," then "Enter Customer Number" and so forth. Therefore, the 3070B can recognize the user and collect operating information in a consistent and orderly way from cards or from the keyboard, the spokesman said. It can then confirm the transaction with a message on the LED readout or with a printed slip.

Typically, the terminal would be used for such activities as work in progress, production scheduling, cost accounting and shipping and receiving.

The program-definable keys, each of which causes a single predetermined character to be sent to the computer, can be preprogrammed, for example, to provide a "yes" or "no" answer, to start a previously defined subroutine

Terminal Transactions

or to report an action by sending a previously agreed-upon sequence of symbols, according to the firm.

As many as 56 of the 3070B terminals can be connected via a single multi-drop two-wire cable up to 2.4 miles long. Earlier HP 3070A terminals can be mixed with 3070Bs on such a line, the firm said.

In addition to its CPU interconnection, the 3070B has a standard HP interface bus (IB) connector on its back panel. By relaying appropriate communications from the HP 1000, the 3070B can control a local array of instruments or other HP-IB programmable devices, collect the data produced and forward it to the computer, the spokesman said.

The price of the 3070B is \$3,200 including the multifunction reader and the strip printer. HP is at 1507 Page Mill Road, Palo Alto, Calif. 94304.

CRT Offers Big Characters

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc. has announced the availability of a double-size character option for its Model 400E CRT terminals for use in applications where readability at greater distances is desired.

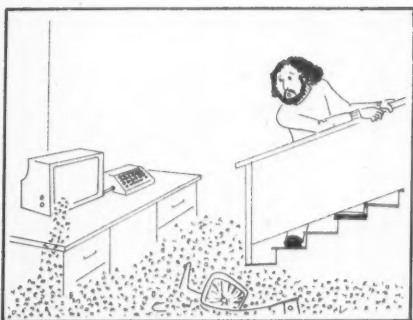
Characters are approximately 1/2-in. high and can be read from distances of up to 15 ft, a spokesman said.

The unit's refresh memory stores 2,000 characters in a 50-line by 40-char. format. Twelve lines are displayed on the monitor at one time, with the remaining 38 lines accessible in either roll or scroll modes, according to the firm.

Three character accents — blink, dim and reverse video — are standard, as are an RS-232 interface and RS-170 video output for driving auxiliary monitors, the firm said. A 15-in. non-glare screen is included in the unit and the cursor is displayed as a blinking field.

The Model 400E includes a 72-key detachable keyboard which generates the full 128-char. Ascii set, the spokesman said.

The 400E responds to 14 commands from either the CPU or the keyboard.



All operations controls may be changed from the keyboard including data speed (110- to 9,600 bit/sec), I/O mode (local, full- or half-duplex), keyboard mode (teletypewriter or full Ascii) and display mode (page, roll or scroll), the firm said.

Options include upper/lower case character display, export power, bell, current-loop cable and up to 36 function keys, the firm said.

Prices begin at \$1,260 from the vendor at 6107 Jackson Road, Ann Arbor, Mich. 48103.

Tape Unit Works At 300 Bit/Sec

SADDLE BROOK, N.J. — Drillick LaManna Corp. (DLC) has introduced a paper tape punch/reader designed to be used with the current generation of 300 bit/sec printers, CRTs and other devices, a spokesman said here.

The DLC 3000 is connectable via an RS-232C interface to provide an automatic send/receive capability, according to a spokesman. The unit can also stand alone to send and receive data and to punch and duplicate tape, he said.

While the RS-232C/CCITT V. 24 interface is standard, current-loop interfaces are also available. Standard switch settings include half- or full-duplex, 110- or 300-bit/sec and remote control of the reader and punch. Units are also available that operate from 220V 50 Hz, according to the firm.

The unit costs \$1,795 from DLC at 280 Midland Ave., Saddle Brook, N.J. 07662.

Still squeezing data through the old-fashioned way?

Concentrate. It's cheaper!

If you would like to put several asynchronous terminals on one telephone line, read on.

MICOM's Micro800 Data Concentrator has obsoleted the good, old-fashioned TDM or time-division multiplexor. If you prefer to call it a statistical multiplexor or intelligent TDM, feel free. Either way, the Micro800 provides retransmission on error and, typically, double the efficiency of TDM. It's not a penny more than a TDM, and it's not a paper tiger.

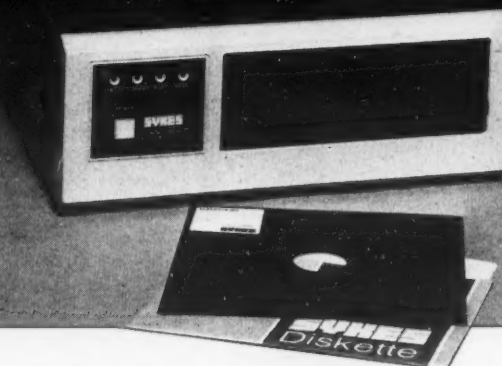
Curious?

MICOM MicroComputers for DataCommunications

MICOM SYSTEMS, INC. • 9551 Irondale Ave. • Chatsworth, CA 91311 • Tel. 213/882-6890 • TWX 910/494-4910

- DECwriter • Beehive
- Lear Seigler • Teletype terminals
- ADDS • GE Terminets
- Hazeltine • TI, etc.

Users Save 50%



Add Comm-Stor II to your dumb terminals and save 50% of the cost of purchasing a new intelligent terminal. Comm-Stor II provides: local disk storage, editing, forms data entry, IBM 3740 EBCDIC and format compatible and high speed communications. Immediate delivery and local service.

Price: \$2825 single drive quantity one, USA.

Call Toll Free 800-828-6308

In New York State call collect 1-716-458-2216

SYKES

SYKES DATATRONICS INC.
375 ORCHARD ST.
ROCHESTER, N.Y. 14608

OUTSTANDING SALES CAREER OPPORTUNITIES CALL LARRY SAMARTIN 716-458-8000

HP Adds Two Versions of Phone Line Analyzer

PALO ALTO, Calif. — Hewlett-Packard Co. has announced two versions of a telephone data line analyzer that measure both steady-state parameters and transients. Transient parameters can be measured simultaneously, according to a spokesman.

The Model 3771A is compatible with CCITT standards and the Model 3771B is compatible with Bell System Publication 41009. The instru-

ments are used for troubleshooting telephone lines carrying high-speed data, the firm said.

Measurements of steady-state parameters include level, phase jitter, weighted noise and frequency shift. Transients measured include dropouts, phase hits, gain hits and three-level impulse noise.

Because of the nature of transients, they are normally measured over 15-minute in-

tervals. By measuring transients simultaneously, the 3771A/B saves operator time and makes a comparison of results statistically valid, the spokesman claimed.

A portable CCITT data line testing facility can be made by combining the 3771A with either the HP Model 3770A amplitude/delay distortion analyzer or the Model 3770B telephone line analyzer, the spokesman said. Routine data

line measurements can be made using the 3770A/B and troubleshooting measurements using the 3771A.

The Model 3771B Bell System version can be used with the Model 4943A and Model 4944A transmission impairment measuring sets for line characterization and testing.

While the 3771A/B can be used as a stand-alone test instrument, a forthcoming HP-IB (IEEE-488) option will

make it usable as part of an automatic test system. This option, to be available in August, will allow the units to be controlled externally via the bus, according to the firm.

Other optional features include a printer output for recording transient measurement results and a loophold option.

In the 3771A, these instructions can be supplied in English, French, German, Italian or Spanish, the firm stated.

The price of the 3771A and 3771B is \$7,150 from 1507 Page Mill Road, Palo Alto, Calif. 94304.

SHORT-TIMERS!

I/O Terminal Rentals: From a day to a decade.

Renting gives you a real choice

Now you can rent the latest CRT terminals, teleprinters and protocol monitors by the day, week, month or longer.

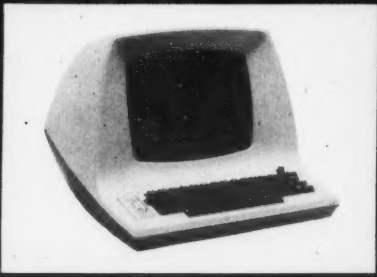
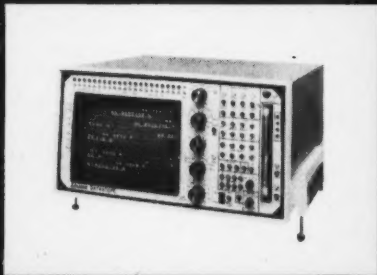
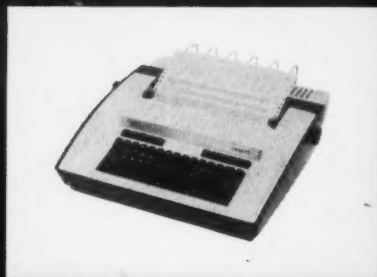
Choose the datacomm equipment you need from the world's largest rental inventory of telecommunications equipment.

Top manufacturers like Teletype, Texas Instruments, Lear Siegler, DEC, and Hewlett-Packard—we've got them all!

Immediate availability makes renting an obvious answer to most emergency equipment problems. Renting offers you both the operating and financial flexibility you can't get when you buy or lease. Renting is "non-obsolescent."

Renting is leveling out demand peaks and valleys. Renting is low-cost. You get what you need—when you need it—for as long as you need it!

Only one monthly charge
When you rent from



Leasametric you pay just one low monthly rate. There's no extra installation/take out fee, no add-ons, no monthly maintenance or repair costs. We take care of everything.

Service is our business

All equipment is inventoried and serviced by experienced professionals at Leasametric's 20 Regional Inventory Centers across the U.S. and Canada.

In the event of a failure, we'll replace malfunctioning equipment with a fully-operational unit within hours. You deal directly with Leasametric's applications specialists and technicians who are geared to respond to your emergency problems quickly and efficiently.

Call your nearest Leasametric Inventory Center today for immediate delivery of the latest CRT terminals, teleprinters and protocol monitors. Ask for your FREE EDP Equipment Rentals Brochure outlining our many services.

Leasametric

Division of Metric Resources Corporation 822 Airport Blvd., Burlingame, CA 94010

INVENTORY CENTERS: San Francisco, CA (415) 342-7111; Los Angeles, CA (213) 768-4200; Anaheim, CA (714) 634-9525; San Diego, CA (714) 565-7475; Houston, TX (713) 988-1000; Chicago, IL (312) 595-2700; Boston, MA (617) 272-6520; Midland Park, NJ (201) 444-0662; Long Island, NY (516) 293-5881; Washington, D.C. (301) 881-6700; Orlando, FL (305) 857-3500; Dayton, OH (513) 898-1707; Philadelphia, PA (215) 583-2000; Denver, CO (303) 429-7900; Minneapolis, MN (612) 854-3426; Dallas, TX (214) 661-9193; Atlanta, GA (404) 491-1155; Seattle, WA (206) 455-3080; Baltimore, MD (301) 444-5144; Toronto, Ontario (416) 676-1897.

TOLL FREE NUMBERS: Outside California 800-227-0280; Outside New Jersey 800-631-7030; Outside Maryland 800-638-0838; Outside Illinois 800-323-2513.

Halcyon Unveils Link Analyzer, Extra Memory

SAN JOSE, Calif. — Halcyon, Inc. has introduced a data link analyzer with an optional memory cassette unit.

The Model 803A Ufox data link analyzer is a diagnostic tool for data communications facilities. For on-line testing, the instrument monitors the data stream in a variety of codes, checking text, control and protocol characters.

Used off-line, it simulates a CPU, a terminal or a modem to isolate any problem, a spokesman said.

Microprocessor control and a conversational language aid its operation by nonprogramming personnel, the spokesman said. An optional cassette unit supplements internal program memory, providing an extensive program directory.

The tape unit can also be used to record processed data on events of interest, he noted.

Factory programs include a diagnostic routine for the AT&T Dataspeed 40/4 and terminals with similar operating formats. Other programs to fit specific applications can be field-developed "in minutes," according to the firm.

Additional features include software updating by programmable read-only memory replacement, self-check routines, indicators to show the status of RS-232 leads and test points for all important leads.

The price of the unit is \$8,995 from 1 Halcyon Plaza, 2121 Zanker Road, San Jose, Calif. 95131.

DECwriter II's & III's

FOR SALE

• LA36 • LS120

BEST PRICE • FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960

Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

Bits & Pieces

Splicer-Punch-Gauge Works on 1-In. Tape

MONTEREY, Calif. — The Datacq Co. has announced a splicer-punch-gauge for 8-, 7/6- and 5-channel punched tape.

The unit is said to work on every type of 1-in. wide tape, including metalized Mylar, and to simultaneously block punch all 90 holes of 10-level tape.

The device takes advantage of the static charge present in most splicing material by using it to align the splicing material and hold it flat on the unit before it is applied, according to the company.

The machine's price ranges from \$75 (without bit punch) to \$125 from the vendor at P.O. Box 3223, Monterey, Calif. 93940.

Matrix Label Printer Debuts

DAYTON, Ohio — A matrix label printer capable of printing in type sizes ranging from .1-in. to 1 in. has been introduced by Standard Register.

The Model 300 label printer is a micro-processor-controlled, tractor-fed, dot-matrix printer device with RS-232C interface and can be operated either stand-alone or attached to a standard data entry device, a company spokesman said.

The unit is said to be capable of operating speeds up to 300 line/min for .1-in. characters regardless of line length and can print the OCR-A font as well as scannable bar code.

The Model 300 is available for delivery with 90-day lead time, and prices begin at \$12,550 from the company at P.O. Box 1167, Dayton, Ohio 45401.

Fire Extinguisher Uses Halon

WESTCHESTER, Ill. — A portable fire extinguisher containing the Halon 1211 fire-fighting agent is available from the Visible Computer Supply Corp.

The unit's discharge does not affect information stored on magnetic tape or electronic equipment, a spokesman said. The Halon mixture reportedly leaves no residue.

The extinguisher costs \$84 from the firm at 9855 Derby Lane, Westchester, Ill. 60153.

3M Adds Extra-Capacity Cartridge

ST. PAUL, Minn. — The 3M Co. has an extra-capacity data cartridge that provides 150 ft. more of tape for users of that firm's Scotch DC 300A unit.

The DC 300XL is suitable for backup of disk data systems and in applications where extensive logging is involved, the firm said.

Price of the cartridge is \$23 from 3M, Department 89, Box 33600, St. Paul, Minn. 55133.

Service Bureau Succeeds In Coupling Large CPUs

By Tim Scannell
CW Staff

PHILADELPHIA — Undaunted by the "horror stories" of other firms who had failed with similar projects, a service bureau here successfully linked two large-scale mainframes.

The Uni-Coll Corp., jointly owned by the University of Pennsylvania, Drexel University and the University City Science Center, joined its IBM 370/168 system with an identical CPU "in a tightly coupled multi-processing system that will permit each computer to share the other's memory workload without changes in customer programming," according to James Gallagher, president and chief executive officer of the service bureau.

"The result will be a significant improvement in the services the company can offer its customers," Gallagher said.

Uni-Coll, incorporated in 1971, provides both academic and administrative DP services to approximately 30 colleges and 250 commercial and industrial users throughout the Northeast region of the U.S., according to David Workman, vice-president, controller and secretary. More than 80% of the users access the system via remote job entry (RJE) time-sharing terminals, Workman said.

"The commercial users are within the engineering and transportation fields," he ex-

plained, adding that various levels of the U.S. government also use the system for administrative processing.

Initial Apprehension

Officials at the firm were, at first, apprehensive about coupling the mainframes. "While it was . . . a carefully planned project from the start, we were concerned that adding the second machine might interrupt our time-sharing services," Workman said.

"Installation of IBM's MVS operating system was required before the mainframes could be linked," Workman stated. "We had heard a lot of stories concerning companies that had failed to install and bring up the MVS system," he said. However, the original 168 continued to operate while the second CPU was being installed "with no interruption of service whatsoever."

Of course, "there were some problems, as one would anticipate, but certainly nothing major," Workman remarked.

Before the final decision was made to acquire a second IBM mainframe, corporate officials briefly considered an Amdahl Corp. CPU, Workman said. "We decided upon IBM principally because we felt that the Amdahl, while a highly attractive system, was untested in the real world," he stated. "We wanted to go with something that had a

(Continued on Page 34)

Dallas County Switches CPUs To Gain Cost, Growth Benefits

By Tim Scannell
CW Staff

DALLAS — The County of Dallas Data Services Department here has increased the memory capacity of its DP center and expanded its growth potential by replacing an IBM mainframe with two Intel Corp. AS/5 CPUs.

The decision to acquire the Intel systems was based on department funding restrictions, according to Charles Collier, DP director. The AS/5s provided the necessary power and performance to handle all the department's on-line functions, and the county got two systems "for about the price it was paying for one 370/158," Collier said.

The Data Services Department is responsible for virtually all of the DP functions within Dallas County, he said. It handles personnel payrolls, budgets for the auditor's office, the county clerk's records and voter information such as certificate lists, precinct lists and guidebook mailings.

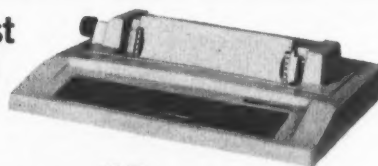
The department also maintains a file of the number of adults on probation and the "fees" they have paid. "These fees range from \$1 to \$10" and are added to the restitution that a probationer may have had to pay back, Collier stated.

The records for all the county and district courts, the district attorney's office and the sheriff's department are also processed by the department. "In all, there are about 350 terminals spread throughout Dallas County that come into our system," Collier explained.

The law enforcement branches access the network of the National Crime Information Center via the computers at the Data Services Department. Telephone lines connect the AS/5s with the Department of Public Safety switching stations in Garland and Austin, Texas, which, in turn, are linked to the nationwide crime reporting system, Collier noted.

(Continued on Page 34)

How can you get the best value on the 1200 baud DECwriter III?



Call DDI, America's leading terminal supplier, for answers only we can give you!

CALL OUR NEAREST BRANCH OFFICE. Whether you want to rent, lease or buy one — or dozens — of the versatile, high speed DECwriter III's, you'll like what you hear. As America's leading terminal supplier, we offer you values and service no one else can match. With DDI, you get:

- A single source for DEC, TI, ADDS, DIABLO, OMNITEC, TECHTRAN.
- Full range of new products.
- Choice of rent/lease/buy plans.
- Unique Combination Savings Plan.
- Nationwide maintenance service.
- Nationwide branch network for prompt response to your needs.

Data Dimensions, Inc.

51 Weaver St., Greenwich, Ct. 06830
TEL: (203) 661-1700

BRANCH OFFICES: New York City (212) 687-2030 • Morris Plains, N.J. (201) 267-2311 • Philadelphia (609) 662-2833 • Washington, D.C. • (202) 686-5150 • Cincinnati (513) 769-0780 • Detroit (313) 358-2600 • Chicago (312) 858-3770 • Atlanta (404) 433-2023 • Dallas (214) 387-2222 • Houston (713) 961-4711 • Los Angeles (213) 990-9200 • San Francisco (415) 349-7262

Tandberg Offers Formatter

SAN DIEGO — A tape drive formatter, capable of generating and reading Ansi-, IBM- and Ecma-compatible tapes, has been introduced by Tandberg Data, Inc.

The microprocessor-based TDF 4050 is designed to work with 9-track 1,600 bit/in. phase-encoded and 800 bit/in. NRZI tape drives as well as 7-track 200-, 55- or 800 bit/in. NRZI drives. It can execute all standard commands, such as reading in forward and reverse modes, writing forward and writing forward in edit mode and writing file marks, according to the company. It

will also accept customer-specified commands, the firm added.

The formatter can be equipped with an optional programmable read-only memory (Prom) so it can be serviced using normal test equipment and is controlled by a master crystal oscillator, a company spokesman said. It is compatible with both the Pertec Corp. and 50-lead flat cable standards.

The TDF 4050 is mounted on a single printed circuit board, and prices start at \$2,300, Tandberg said from 4060 Morena Blvd., San Diego, Calif. 92117.

County Switches Systems

(Continued from Page 33)

Although Collier is satisfied with the performance of the Itel mainframes and their easy adaptation to his department's configuration, he failed to note any marked difference between them and the previous IBM system. "It's hard to say that the AS/5 is faster or slower or anything like that because I made quite a few equipment changes when installing the new machines," he pointed out.

"I was also using Memorex Corp. 3675 disk drives [(before the conversion)], which were subsequently upgraded to the Model 3650, resulting in an increased throughput," Collier remarked.

"I like IBM equipment, but I had some budget restraints I had to fall

into," Collier said. "I had to look for suppliers that could furnish the same performance level I was getting with my existing equipment — for fewer dollars.

"I think it's fair to say I did increase our capacity from 2M bytes with the 370/158 to 6M bytes with the AS/5s, and both machines function at a comparable level," he stated.

The current configuration at the department consists of four Memorex 3674 controllers, four modules of 3653 fixed-head disk drives and 11 Model 3650 disk drives.

Installing the AS/5 mainframes barely interrupted the department's work flow, Collier added. "Everything was switchable. We hit stop for a total of five minutes, moved some jobs over and were up and running."

Firm Couples Large CPUs

(Continued from Page 33)

proven track record of reliability ... IBM offered this and Amdahl didn't."

Uni-Coll's equipment is mostly from IBM, with the exception of a few Memorex Corp. disk drives.

Distribution Activities

In addition to being a service bureau, the firm is also the exclusive distributor of the Wharton Econometric Forecasting Models, Workman said.

The Wharton group, headed by Dr. Lawrence Klein, produces models of the economies of various governments including that of the U.S., Mexico and Brazil. The group comes out with quarterly econometric forecasts to which many companies subscribe,

Workman explained.

Wharton Econometric Forecasting Associates, Inc., originally a customer of Uni-Coll, was recently incorporated as a part of the bureau's regular operations.

Uni-Coll officials hope with the addition of the second IBM 370/168 and several enhancements in the firm's telecommunications network, the company will be able to expand from being a regional computer utility to a national and possibly international service bureau. "Our extensive software library including both utility-type software and application software ... can then be available in principal cities throughout the world," Workman said.

Firms Offer Free Brochures

The following firms are offering free literature:

- Calma, a supplier of interactive computer-aided design (CAD) systems, is offering a 12-page brochure detailing their activities in research and development, manufacturing and marketing applications. The company is located at 527 Lakeside Dr., Sunnyvale, Calif. 94086.

- A microcomputer system configuration guide that shows users how to take a building block approach to the design of control and data collection systems is available from Wyle Laboratories/Computer Products. The chart is based on the Wyle line of pre-wired microcomputer rack, drawer and cabinet configurations and helps the user select the required complement of modules for a specific task, a spokesman said. The firm is located at 3200 Magruder Blvd., Hampton, Va. 23666.

- The Tandy Corp. has released a 52-page catalog illustrating its line of popular brand microcomputers and accessories, software packages, parts and literature. The booklet details microcomputer kits and assembled systems aimed at hobbyists, educators and business users. The catalog is available from the firm at Department R7, Box 2932, Fort Worth, Texas 76101.

- An eight-page brochure from Versatec describing their 7000 series of rack-mountable printer/plotters for military applications can be obtained from the firm at 2805 Bowers Ave., Santa Clara, Calif. 95051.

- A catalog detailing more than 2,500 computer accessory products is available from the Visible Computer Supply Corp., 9855 Derby Lane, Westchester, Ill. 60153.

- A literature packet from Dataware describes and illustrates the firm's chroma/numeric marking systems for tape libraries. The company can be reached at P.O. Box 22788, Houston, Texas 77027.

- The Capacitors and Electronic Components Division of TRW, Inc. has a 48-page booklet about its line of wound film and tantalum capacitors. Copies are available from 301 W. O St., Ogallala, Neb. 69153.

- A 12-page brochure from Powertec, Inc. describes the company's OEM II series of second-generation, open-frame DC power supplies. The firm is located at 9168 DeSoto Ave., Chatsworth, Calif. 91311.

- The Arnold Magnetics Corp. has a four-page pamphlet summarizing its submodular line of miniaturized AC-DC, DC-DC power supplies. Arnold can be reached at 11520 W. Jefferson Blvd., Culver City, Calif. 90230.

- An eight-page brochure outlining a fiche management system (FMS) for data base management of microfiche can be obtained from U.S. Datacorp, P.O. Box 3460, Portland, Ore. 97208.

- A booklet describing the Micro-Master line of automated microfilm duplicators and variable-distribution programmers is available from Keuffel & Esser Co., 20 Whippany Road, Morristown, N.J. 7960.



NEW WATER DETECTION ALARM

... FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

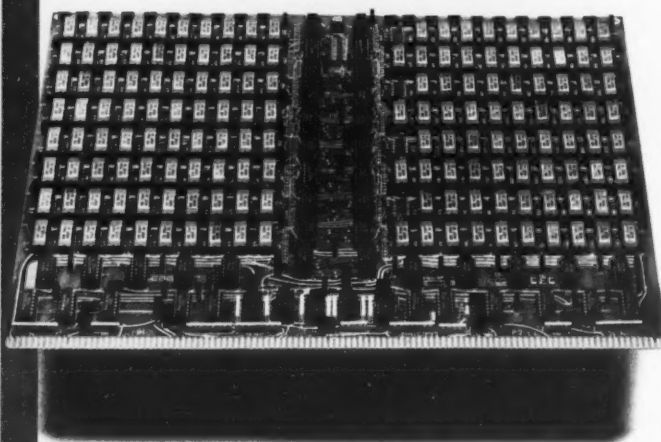
- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained ... no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

From \$40 — \$70.
Ask about **WATER ALERT** today.

Division of Electro Consultants, Inc.
7424 W. Layton Ave., Milwaukee, WI 53220
Phone 414 282-4840

Dorlen Products

RAM-STOR 5000 MEMORY FOR CRITERION COMPUTERS



NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

☐ Urgent! Please phone me, ext. _____
☐ Have your Rep contact me
☐ I want a demonstration ☐ Send me literature

For further information call or write:

COMPUTER ENHANCEMENT CORPORATION
3189-E AIRWAY AVENUE
COSTA MESA, CALIFORNIA 92626
714 754-0521

"Control Data's Mass Storage System was the better business decision for us."



Each Mass Storage Cartridge holds 8 Megabytes and can be accessed in 5 seconds or less.

Charles E. Murdock, Assistant Director (Right) and Marvin J. Bates, Jr., Director of Data Processing for Southern Company Services, Inc.

Bates: "We expect almost instant access and response from our CDC Mass Storage."

"We process in a demand mode. When a request is on the console, we've got to respond quickly. That's why we're taking our small data sets on tape and putting them into Mass Storage. It means that we have almost instant access and response to users."

Murdock: "With 32,000 reels of tape and a library growing 20% annually, our tape library is getting more and more difficult to handle. Mass Storage allows us to maintain control of our data sets, without increasing our facilities, manpower or equipment. For us, it means a cost-effective way to provide good customer service."

Bates: "We want to process user jobs without personal or physical intervention. Mass Storage permits us to do this."

By converting data to Control Data Mass Storage, Southern Company Services expects to eliminate errors from pulling, handling or refiling tapes.

They will be able to supply user data in seconds for their customers—their parent company, The Southern Company, and four affiliated electric utilities. And they will eliminate waste of valuable host computer time.

Control Data's Mass Storage System saves space, too. The System holds 16 billion bytes in less floor space than a row of disk drives.

Perhaps you should investigate some of the reasons our MSS is the better business decision for you. Call us at 612/853-7600. Or write us at HQN111, P.O. Box O, Minneapolis, Minnesota 55440.

GD CONTROL DATA CORPORATION

More than a computer company

On-Line Pest Control Firm Kills Paper Bugs

By Alan D. Reyelts
Special to CW

GRAND FORKS, N.D. — The summer of 1976 now seems like a bad dream. At the time, Lystads, Inc. had an IBM System/3 Model 12 installed and was processing strictly in a batch environment. The company had just completed one of the busiest seasons ever experienced.

At the time, Lystads, a pest control service-oriented business, had approximately 200 people in the field doing its contract work. The majority were in sales. Like most salesmen, they all left their paperwork until there was nothing else to do or until they were forced to do it in order to be paid — usually the last working week of the month — and would force 40% to 50% of the workload into that time frame.

Scheduling the peak workload was the biggest problem Lystads encountered that summer. It could not justify hiring enough personnel to handle that one-week overload. By using existing staff and scheduling many hours of overtime during that period, Lystads always seemed to get the job done.

The area that caused the largest problem was turn-around time of the month-end reports. Coding and keypunch errors seemed to be on the increase.

Looking into the crystal ball, Lystads could foresee the following summer would only be worse. Management had set a goal of 15% to 20% increase in business. The DP department met with the president of the company and explained what would be needed to meet the goal.

If the company was to grow the 15% to 20% management had set as its goal, DP would need to hire six additional people and put one additional IBM 3742 on order to handle that situation. This additional \$4,500-plus expense was not a rosy picture to paint at that time.

On-Line Investigated

The DP manager had been involved in on-line processing in a previous job. He told management it should investigate going on-line rather than add the additional batch peo-

ple and machine, stating that it might be a cheaper approach to take. He found management to be receptive to the on-

done in the shops visited and decided to investigate it further for cost.

The time had come. The DP

time they would try and show what type of job could be done in an on-line environment. The president agreed and said that at the end of the trial period he and the other office personnel would decide whether the firm would continue along those lines or go back to doing the job in a batch environment.

One additional selling point was that since the whole industry was going to on-line

processing, it would be good to put all of the firm's development on-line.

Upon receiving the CRT, the DP department was ready. It had, at that time, programs written to show how maintenance would be performed, how the credit manager might use the CRT to look up previous accounts receivables and how data entry punching could handle all cash coming

(Continued on Page 40)

Data Entry Dimensions

line idea. A trip was scheduled to two installations that were processing on-line with a System/3. Management was pleased with the work being

manager and the IBM salesman went to the president of the company and made a pitch to bring in a CRT for a two-month trial period, at which

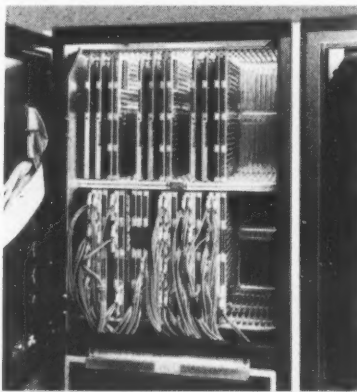
There's only one thing non- It's non-stop.

Where others fail. It's simple. You must have a non-stop system to have non-stop COBOL. And only Tandem has it. A unique multiple processor on-line system which ensures protection of the data base, and that no transactions are lost or duplicated, even if a processor, I/O channel, disk controller or disk should fail. Best of all, the system keeps running.

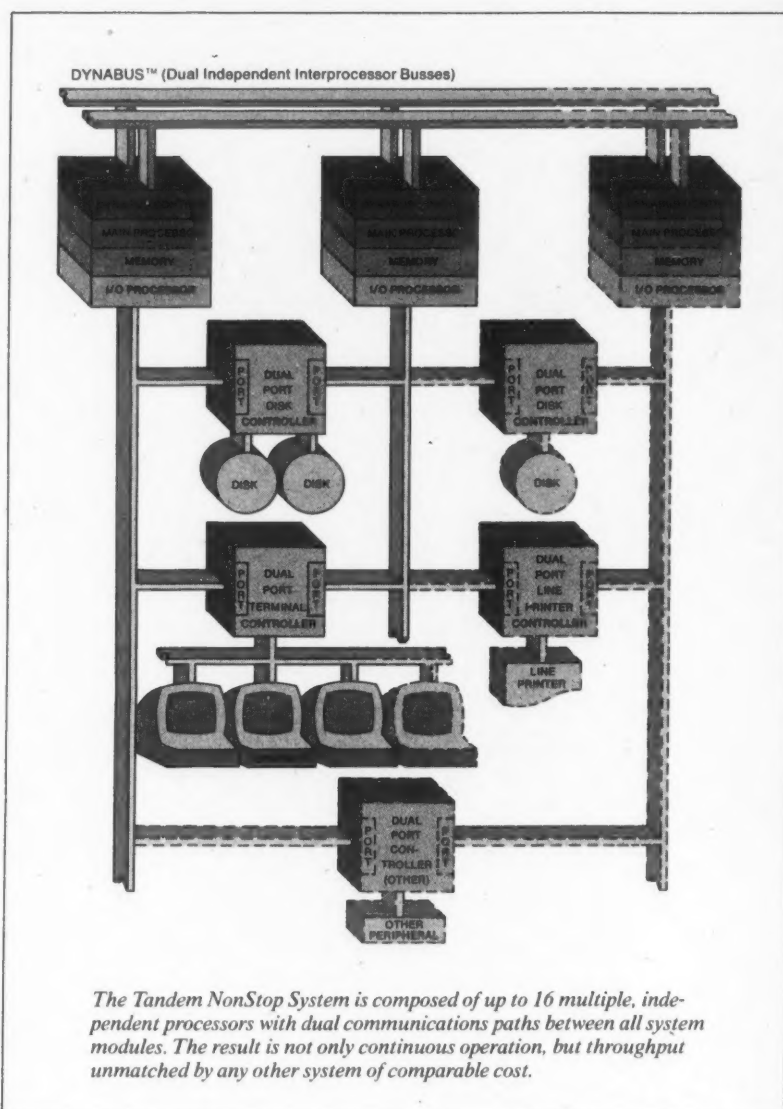
Multiple Processor COBOL. Easy.

Bearding the Lion. You'd think that programming for a multiple processor on-line system would put you in a jungle, but Tandem COBOL purrs. Completely standard.

Because Tandem COBOL runs under our Guardian Multiple Processor Operating System, no custom system software is required. No special development tools are required. None. Our COBOL program development is standard. Our run-time software is standard. Everything you've always liked about COBOL, easy to use and trouble-free. And COBOL programs can run concurrent with other languages.



Four BILLION bytes per file. With no limit on the total data base size. Key sequenced, entry sequenced or relative file structures. With up to 255 alternate keys per file. And optional mirror copy by disk volume. It's incredible storage and tremendous flexibility in a mini-based system. And of course, it's non-stop.



Sharing a common data base. Three new verbs, LOCKFILE, UNLOCKFILE, and UNLOCKRECORD have been introduced to the Tandem COBOL I/O facility to permit the use of corresponding system file and record locking routines, and allow separate processes to share a common data base. READ and REWRITE verbs have been extended to allow specification of LOCK or UNLOCK operation. OPEN syntax has been

extended to specify the file access, EXCLUSIVE, SHARED, or PROTECTED, and to permit the SYNC-DEPTH for files opened in the OUTPUT, I/O or EXTEND mode.

With STARTBACKUP and CHECKPOINT. These are logical extensions of Tandem COBOL which implement the NonStop™ features of Guardian Multiple Processor Operating System. STARTBACKUP is called once at the

165-II

With a DAT this is almost a 168! Machines available now. With tie-in leases to your 3033

COMDISCO
312-698-3000

Serves Card-Oriented Environment

RJE Net Tracks Big Number of Small Parts

By Rebecca A. Rouch

Special to CW

ALBUQUERQUE, N.M. — GTE Lenkurt, Inc. here, a manufacturer of communications equipment, has been using shop floor data collection devices for production tracking since early 1977.

The tracking system was developed in response to the problems involved with moni-

toring the production flow of over 400 types of hybrid circuits, any of which might be in production, with quantities varying from 200 to 50,000.

Compounding the problems of small size and large numbers, the parts are passed through more than 15 physical locations in the plant, from initial staging through manufacturing, testing and pack-

ing. A reporting system was needed to tell at any given time how many parts were available at various stages of completion in order to determine the length of time necessary to complete an order. When the problems were discussed with the DP department, the need was both serious and immediate.

The company's headquarters

are in San Carlos, Calif., and the Albuquerque processing is done by remote job entry (RJE) under Hasp with the San Carlos CPU, an IBM 370/145. Two Data 100 Corp. remote batch entry stations are used by the plant here to communicate with the 370/145; a Model 78 configured as a 360/20 Hasp work station and a Model 76 simu-

lating an IBM 3780 RJE terminal.

The Model 78 is configured with a 400 line/min printer, a 90 card/min punch, a 300 card/min reader and an 800 bit/in. 9-track tape drive. The Model 76 has a 300 card/min reader and a 300 line/min printer. The data entry function is handled by four IBM 129 keypunch machines.

For the hybrid tracking system, IBM 5230/3 data collection devices were selected. The 5230/3 was chosen because its 80-column punched card output fit well into Lenkurt's card-oriented environment. The 5230/3 consists of a control unit and from one to 15 data collection stations.

Each station resides on a coaxial cable that loops from the control unit to the shop floor and back. There can be four stations on each loop. The first loop has a test station at the controller and can maintain only three actual input stations.

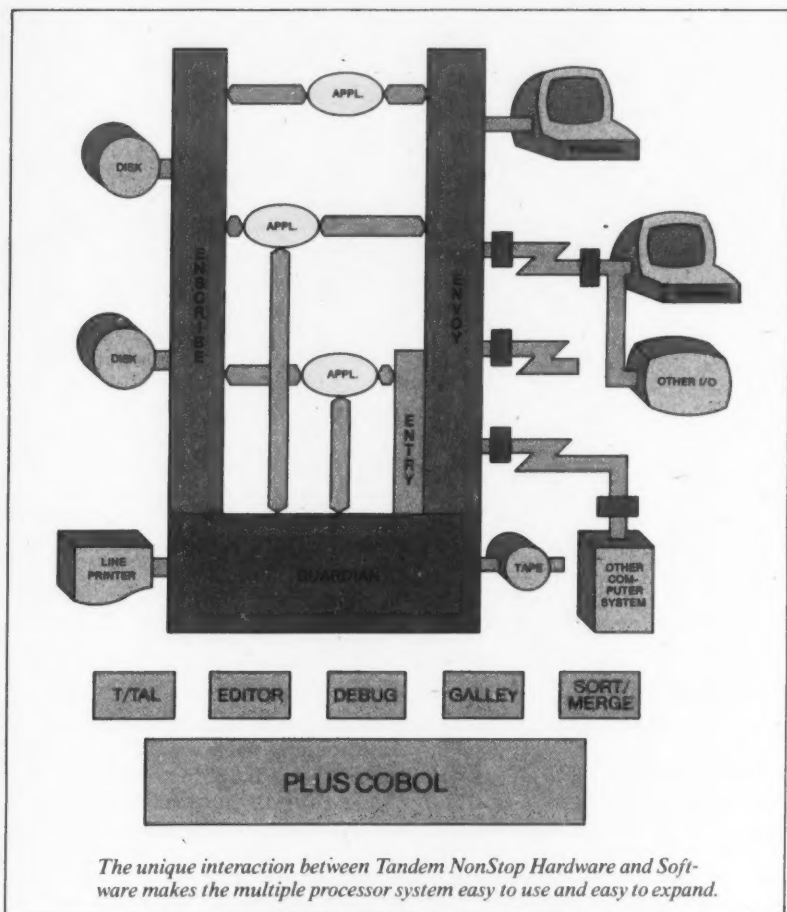
The 5230/3 has two input device options: a stand-alone badge reader or an input "box" which has eight action keys, a 10-key keyboard, a card reader and a badge reader. The second type always has the keyboard, but the badge and card reader are optional depending on the application requirements. The action keys can be used to designate record types to the application programs.

The control unit builds a 199-character buffer record from data generated at an input station. The 5230/3 controller must be programmed to format records for application use. The output format is always as programmed, regardless of whether the input comes from cards, badge reader or keyboard. The Lenkurt system was programmed to create 80-column punched cards from the 199-character buffer.

The cards are used in application programs that select the appropriate input using a one-character code; therefore, although the output limitations may seem restrictive, the capability exists to develop different types of record formats.

(Continued on Page 40)

standard about our COBOL.



beginning of the program to set the NonStop mode. From then on, CHECKPOINT controls passing information to the backup process at critical points. CHECKPOINTS occur automatically at any OPEN or CLOSE after the backup is established. These two simple instructions eliminate the downtime, restart, and revalidation which plague any user without the Tandem NonStop capability.

ANSI X3.23 '74 to Level 2 in Nucleus, Table Handling, Sequential I/O, Indexed I/O, and Sort-Merge right now. With Communications to Level 2 this Spring. Completely standard with CVSS and that means portability.

Compiles more than 1,000 statements per minute. And that's only average. In some benchmarks, we've topped 1,250 statements per minute. It's big system COBOL at mini-based prices. And non-stop, too. Not even the largest computers can match that.

It's working now. There are more than fifty Tandem NonStop Systems installed in a variety of applications. In banking, distribution, department stores, utilities, legal firms, hospitals, universities, steel mills, even a municipal network emergency system. Wherever downtime or a system failure means a potentially unrecoverable loss. There's only one NonStop System on the market today. It's expandable without penalty. Without reprogramming. Without one cent of loss on the original investment. And it's easy to use as COBOL. Good old standard COBOL without the operational difficulties or special expense you'd expect in an on-line multiple processor system which won't quit.

For further information, contact Tandem Computers, Inc., 19333 Vallco Parkway, Cupertino, California 95014 or Tandem Computers GmbH, Bernerstrasse 50, Frankfurt 56, West Germany.

TOLL FREE 800-538-9360 or (408) 996-6000 in California.

TANDEM



Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3

BEST PRICE
FAST DELIVERY

CALL TOLL FREE 800-323-2288

IN ILL. CALL 312-279-1960

Data Equipment Group

ICE, INC.

772 N. Church Rd.
Elmhurst, Ill. 60126

OCR System Reads Handprinting Mixed-Media Entry Sews Up Apparel Orders

By James L. Weaver

Special to CW

SHAWNEE MISSION, Kan. — The H.D. Lee Co., Inc. here is using a mixed-media data entry operation to process customer orders that are completed by hand by approximately 300 Lee salesmen.

Like most major apparel manufacturers, Lee is an active user of computers. The mainframe CPU is an IBM 370/158 operating under OS/VS1. Data entry equipment consists of a Scan Data Corp. 2250/1 optical character recognition (OCR) system and 2250/2 key-to-disk system.

The OCR system consists of a Digital Equipment Corp. PDP-8 CPU with

20K storage, 4.4 million bytes of disk storage, 9-track 1,600 bit/in. tape drive and a Scan-Plex I correction station. The customer order forms are 8.5 in. by 12 in. averaging 106 characters

Data Entry Dimensions

of handprint data per document. Processing speeds are 800 to 1,000 document/hour using the Scan-Plex I correction station for entry of nonrecognizable characters. Reject rate since January 1975 has remained at .5% for

.5% for numeric characters.

The 2250/2 key-to-disk system is a full key-entry system with more than 100 programs being used for various job requirements. The key-to-disk system consists of a CPU with 104K-byte storage, 4.4 million bytes of disk storage, 9-track 1,600 bit/in. tape drive, 200 line/min printer and 16 Scan-Plex II key stations. The key-to-disk system has a powerful, reliable operating system. Downtime for three years of operation has totaled less than 16 hours.

Constant Changes

In the apparel industry, seasonal, fashion and market changes occur

constantly. These changes require sales information to be analyzed as quickly and accurately as possible. Reaction to sales trends is a requirement for forecasting, production planning; and numerous other critical functions.

On each release of one of Lee's four selling line announcements made each year, the resulting volume of customer orders increased up to five times over the normal volume. Despite all efforts and planning of the data entry section of DP, the manual key entry system could not and still cannot adjust itself to the volume fluctuations and maintain a current status.

In June 1974, Lee management charged DP with the responsibility of seeking a lasting solution to the problem of backlogged orders. The means and methods were open as long as the cost was close to the current expenditure.

The manual key entry system used six IBM keypunches and 24 IBM 050 key-to-tape units. Using this system, overload help and mandatory overtime were considered normal during new line releases and were still unsuccessful in maintaining a current status of orders received to process.

The DP study reviewed numerous vendors representing every type of key entry device and approximately 44 vendors of OCR equipment. Only Scan-Data approached the problem of mixed data entry using key entry and OCR entry in combination with one basic set of hardware.

After extensive benchmarks of three OCR vendors, Scan-Data was chosen. During the study and benchmarks, the vendor expended a great deal of time and money to promote its product. The OCR hardware was rated tops in readability, reject handling, data formatting, space preservation and 35 other points that were considered relevant. In addition, the 2250/3 mixed-media system was available to complete the data entry keying requirements.

Contingency Clauses

Contingency clauses in the original contract required Scan-Data to assume full responsibility for the forms design, printing, equipment installation and programming for the initial application. In addition, a 30-day acceptance period was guaranteed with charges limited to the forms cost during this period. Scan-Data agreed to these terms provided Lee would follow a list of guidelines necessary for a successful installation.

By December 1974, Lee personnel had completed the OCR salesman training manuals for the 150 fashion salesmen. These manuals were used in successively held regional sales meetings introducing the January selling line and the new OCR system. A full day was spent in each meeting discussing the OCR system and the OCR forms, which were a radical departure from the manual order forms previously used.

The redesign of the order form played a big part in acceptance of the system by the salesman. The OCR forms require less writing. Salesmen noticed a tremendous time savings

(Continued on Page 44)

More ways to grow with EMM add-on memory.

THROUGHPUT
(increased through enhancements)

up to 25%

UPGRADES

370s
360s

EMM add-on memories offer you the best alternatives for growing your IBM mainframe capability by adding capacity, providing faster throughput by means of enhancements, and upgrading to a newer or larger IBM CPU.

Our three generations of add-on memories provide

more models than virtually anyone else in the business. All with IBM compatible core and static RAM technology. That's not all you get with EMM. You get fast installation. Service second to none. Financial packages that enable you to grow. It all adds up to more growth flexibility for you. And more confidence in your growth potential.

Any way you look at it. The real proof is in the numbers. Over 1200 units installed. It means more people are growing in more ways with EMM add-on memory. Call or write today, for the complete EMM add-on memory story.

The difference in add-on memory

EMM

COMPUTER PRODUCTS

A Division of Electronic Memories & Magnetics Corporation
2311 W. El Segundo Blvd., Hawthorne, CA 90250

For more information, call your regional EMM sales office. Eastern (201) 777-4404. Central (312) 297-3110. Western (213) 777-4070. Canada: Toronto (416) 626-1180. Europe: Bad Homburg, West Germany 06172/8094.

Three new Digital Disks.

RK07
28MB
\$10,500

Typical subsystem including controller
and two disk drives 56MB, \$25,000

RM02
67MB
\$18,000

Typical subsystem including controller
and two disk drives 134MB, \$41,000

RL01
5MB
\$3,800

Typical subsystem including controller
and two disk drives 10MB, \$8,900

Your disk decisions just got a lot simpler. Three new Digital disks are here, and with them comes capacity, speed and state-of-the-art engineering at the lowest prices in Digital history.

The RL01 plus controller is the lowest priced disk subsystem available from any mini-computer manufacturer. Plus it offers such features as an embedded track following servo-mechanism, universal power supply and extraordinary simplicity — only five modules and eleven subassemblies.

The RK07 is a mid-range, high performance cartridge disk drive with features normally found on expensive drives over 100 megabytes.

And the RM02 will do for UNIBUS systems what the RM03 did for MASSBUS systems — give you 67MB capacity for a lot less money.

Each new disk offers superb hardware reliability features including wide design tolerances, advanced cooling systems and broad environmental specs. Plus you'll find valuable

data integrity features such as the new servo system on the RL01, and error correction and offset positioning on the RK07 and RM02. And finally, there are remarkable maintainability features like modular assembly, easy-access design, extensive error reporting, and sophisticated diagnostic software.

A new brochure tells all about Digital's commitment to disk leadership — the new products, the new technology and Digital's brand new 430,000 sq. ft. disk plant in Colorado Springs, complete with its own design and engineering force. Send for your copy today. Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd. (Prices apply in U.S. only)

digital

Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754. Attention: Communication Services (NR-2/2)



- ☐ Please send your brochure.
☐ Please have a sales representative call.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW4248

RJE User Tracking Big Number of Small Parts

(Continued from Page 37)

The initial system at the installation consisted of one control unit and three stations with a keyboard, one of which has a card reader. A second coaxial loop and a fourth input station with keyboard and card reader are being added.

The equipment was installed quickly and easily. Two days were required to string the cable for the first loop, an additional day to provide the electrical outlets and another day to physically connect the original three stations to the loop and perform initial testing to ensure proper functioning.

The tracking system itself was also kept simple because of the urgent need for reporting. It was designed as a stand-alone system with no interface with the company's data bases and no attempt to put the system on-line.

Data is entered into stations situated on the factory floor by authorized personnel using a mode key to activate the entry stations. The key was deemed necessary because of the accessibility of the 5230/3 stations to all plant workers. After activating the device, the employee selects an appropriate action key, then in response to cues from the device enters a five-digit portion of

the part number, a six-digit quantity and the locations the parts are passing from and moving to. The time of day is added automatically.

This information generates a punched card at the 5230/3 controller in the DP control room. The cards are removed as the hopper becomes full. Each morning the cards are batched into the hybrid tracking system, which updates the hybrid master file and prints a report showing the number of each type of part in each of 14 locations in the factory.

From the report, management can learn the quantity of any part number at any stage of development within the hybrid manufacturing department. The report can be used to determine the length of time needed to complete any specified number of circuits.

Minor Changes

The system has been operational for over a year and has proved very helpful to those using the tracking report;

only a few minor changes have been made. The equipment has functioned well with no downtime other than the half-hour preventive maintenance provided by IBM when necessary.

The only problem to date has been with the input devices that have card readers being used by another project. The cards often get dirty in the factory environment, requiring occasional cleaning of the card readers on the floor. If more serious problems should ever develop, it would be simple to return to manual coding for future entry through keypunch or a repaired 5230/3 system.

The capacity for expansion exists, allowing additional loops and data entry stations, as well as possible integration with the company data bases and perhaps eventual on-line reporting. A pilot program for using the 5230/3 devices for labor reporting is also being developed.

Roche is a systems and procedures analyst with GTE Lenkurt.

On-Line Pest Control Firm Eliminates Paperwork Bugs

(Continued from Page 36)

into the office. The reaction was overwhelming. Every person wanted to know, "How soon can I have a tube?"

The goals of an on-line system — increased accuracy, better distribution of the workload, increased turnaround time, better utilization of personnel and less paper work — were found to be reachable. The additional cost of going on-line was approximately \$2,900. Staff has not increased, and therefore the firm is saving approximately half the cost of operating in the batch environment.

There are a couple of additional benefits in being on-line. Each employee responsible for a certain area of work is now responsible for it from start to finish, so there is pride in getting the job done. Another benefit that is not talked about much is the ease of training new employees.

Increased accuracy was accomplished because the user departments with CRTs are responsible for their entire workload. The ability to recall a previous transaction to the screen has produced increased self-assurance that they have done the job.

Better distribution of the workload has been accomplished because it is no longer necessary to push all jobs through one data entry department. Being able to use multiple CRTs to do the same job and having many different jobs executed at one time has greatly reduced the stress in getting the total end-of-the-month processing done.

Better utilization of our existing personnel has been accomplished because training to do a new job is much easier using a CRT. All processes are now operator-prompted through the screen and each person's knowledge of the job does not have to be extensive. Simplicity of operation is a definite advantage.

Less paper work is a reality in an on-line environment. The coding sheets previously used for keypunching, with all of the codes for files maintenance or transaction type, have all

been removed from the operation.

It is no longer necessary to recopy information. Data received, in whatever form, can now be easily taken to a CRT and entered. This capability eliminates the coding and keypunch errors and some of the training that was necessary for new employees. It is a goal that is easily accomplished in an on-line environment.

Since the addition of the on-line system, Lystads has decreased turnaround time from three to five days.

The additional equipment costs came about because of the addition of a Model 15D in the spring of 1977. In addition to the 15D, the firm has, over a period of time, added CRTs in user departments. The IBM 3/15D is considered a good choice because it is basically an on-line type of machine and has a lot of capacity for growth.

Using RPG-II as the only programming language, Lystads has, over the last year, implemented 150 on-line application programs that are all running today. To help in the development of programs, Lystads obtained the on-line source program maintenance for IBM's CCP Teleprocessing Interface.

At this point in time, on-line processing has been the best move this department has ever made. Lystads will continue to distribute its workload through the use of on-line CRTs in the user department.

Reyelts is DP manager for Lystads, Inc.



'It's a Problem Associated With Many Home Computer Kit Assemblers. You're Psychoschematic.'

5500 & SSA

210 days after the end of a benefit plan year, IRS and DOL want your annual report, including form SSA, a listing of all terminated employees with a vested accrued benefit...

If your present personnel software can't handle the job, Joe Nestor (617) 851-4111, Wang Laboratories, Inc., Lowell, MA 01851 can tell you about a new Wang System that will...

WANG

Wouldn't it be great to have a portable data system that meets your unique business needs?

Until now, no manufacturer of computer devices has offered a system capable of handling your specific operational problems. They have never bothered with customization to benefit you.

Now the Norand Corporation announces a breakthrough. The power and flexibility of microprocessor technology can now be adapted to your exact business needs with a device you can hold in your hand.

Remember the name — Norand. We have something really different to show you! Look for our advertisement next Wednesday in the Wall Street Journal and in the May 1st issue of Computerworld.

There is a difference.

NORAND

COMPUTER SYSTEMS

Norand Corporation

550 2nd Street S.E.

Cedar Rapids, Iowa 52401

319/366-7611



A subsidiary of Pioneer Hi-Bred International, Inc.

Norand Corporation is a full-line manufacturer of point-of-sale systems, in-pharmacy computers and data communications systems.



Wherever it's said, however it's spelled, Informatics[®] fulfills the promise of the computer...universally!

Informatics...throughout the world, the word is synonymous with the ultimate in modern data processing. In the United States and many other countries, it means the people, products and services of Informatics Inc. One part of the ever-expanding Informatics world...our broad range of software products. We're best-known for MARK IV[®], the general-purpose implementation system installed at over 1,300 computer sites in 43 countries. But we have more to be proud of... some of these are other implementation systems like SCORE[®], and SHRINK[®]. And our communications monitors... INTERCOMM, BETACOMM, and MINICOMM...each for a specific IBM 360/370 environment. Our LIFE-COMM[®] and ISSUE-COMM[®] products for insurance applications, and our ACCOUNTING IV[®] line of products for general

business accounting. Informatics Inc. . . . the world's leading independent software supplier. Drop us a line on your letterhead and we'll send you a colorful brochure that tells how we can help you fulfill the promise of *your* computer.

SOFTWARE PRODUCTS
PROFESSIONAL SERVICES
INFORMATION PROCESSING SERVICES

informatics inc



Corporate Offices/21031 Ventura Boulevard/Woodland Hills, California 91364/(213) 887-9040/Telex 69-8473

Member SIA  Software Industry Association [®]U.S. registered service marks and trademarks of Informatics Inc.

Hotel's On-Line System Eases Check-In, Billing

Special to CW
NEW ORLEANS — When patrons of the Hyatt Regency Hotel here phone

the reservations department, the recording of their reservation activates an automated system that requires no

other entries to prepare for their arrival.

The housekeeping department is alerted, as is the PBX staff. At the front desk, a preprinted registration card is filed before guests arrive. Throughout their stay, all charges to their rooms are captured by on-line processing.

When guests check out, an accurate bill is printed for them in a matter of seconds. There is no waiting for the compilation of charges for phone calls, garage or the breakfast which was finished only minutes earlier.

All of this, and more, is the product of an integrated NCR Corp. software package called Host (for Hotel On-Line System Technique), Michael Garrard reported.

Now in charge of evaluating and coordinating front office and total systems at Hyatt corporate headquarters in Chicago, Garrard was DP manager at the Hyatt Regency New Orleans when the on-line system was implemented in August 1976.

Similar systems had been installed at two of the company's hotels in San Francisco: the 70-room Hyatt on

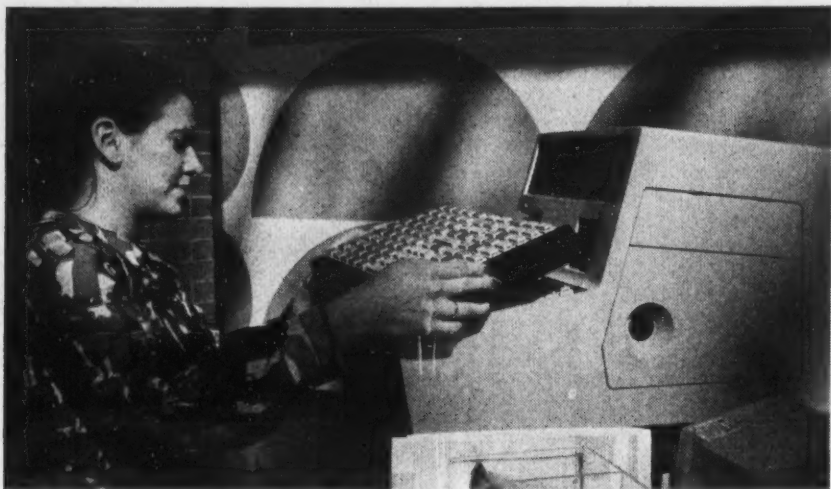
Union Square and the 806-room Hyatt Regency at Embarcadero Center. But they shared a single remote processor until a conversion to individual in-house computers was made in December 1977.

At the larger, 1,200-room Hyatt Regency New Orleans, on-site processing, without any reliance upon external telephone lines, has been the mode from the beginning. At present, the computer configuration at the hotel includes two magnetic disk drives that each put 200 million bytes of information on-line to a 192K CPU.

Linked to the computer is a network of NCR data communications devices. Included are electronic sales terminals, thermal and matrix printers and CRT terminals. The system is on-line for about 21 hours a day, Garrard noted, while more than 40 reports for one kind or another are produced during the early morning hours.

System Operation

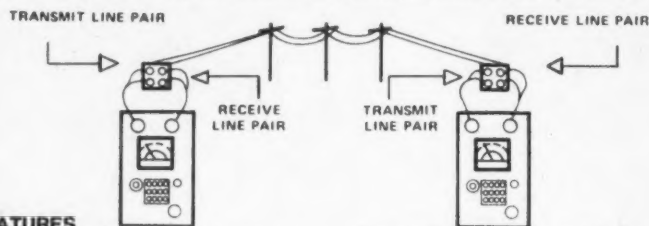
The information gathering begins in the reservations department, which has six of the CRT terminals with al-



Konnie Morrow (standing), PBX manager at the Hyatt Regency, said the computerized display of guest room numbers permits seven operators to handle as many as 15,000 calls a day.

TP-260 DATA LINE TESTER

The TP-260 Data Line Tester offers the user the ability to test both dedicated and dial-up telephone lines and get a quick indication of suitability for data transmission. The unique design of the TP-260 is such that these tests can be carried out by unskilled persons and results are read directly in terms of tariff requirements for data lines.



FEATURES

- Test dedicated and dial-up lines, half and full duplex
- Hand-held, battery operated
- Audio output tests continuity, circuit noise
- Solid state, integrated circuit design
- Trouble shooting can be accomplished by unskilled personnel



TeleProcessing Products Co.

Local Data Distribution

11163 West Pico Blvd., Los Angeles, CA 90064 (213) 478-8988/(213) 879-9045



The reservations department at the Hyatt Regency uses six CRT terminals to enter information directly into magnetic disk storage.

First come, first served

\$666⁰⁰ SALE PRICE
Unimode, Single Lens: 32X



Serviced Nationally by GAF Corporation

EASY TO OPERATE. Insert your microfiche as with any reader. Then select the desired image and depress the print button. Your high-quality permanent print will be produced in less than 8 seconds.
CONVENIENT OPERATOR CONTROLS. The print contrast dial, print length selector, high-low lamp selector, print button, on-off switch, focusing knob, and fiche coordinate selector are all within easy reach.
POSITIVE FOCUS. The floating lens insures focus over the entire microfiche.
FAST OPERATION. The GAF 5000 Reader-Printer provides you with eight high-density, minimum cost electrostatic prints a minute.
CONTEMPORARY STYLING. The sleek, low silhouette of the GAF 5000 Reader-Printer provides a handsome, uncluttered look in any office or business environment.

NON-GLARE SCREEN. The 11" x 11" screen is specially coated to provide a non-glare high-resolution image for ease of viewing.
OPERATOR-ORIENTED SUPPLIES. Print paper is easily loaded from the top of the unit. The toner tray is easily accessible from the rear. All supplies are available from Information Technology, Inc.
DURABLE, HIGH-QUALITY CONSTRUCTION. The GAF 5000 Reader-Printer is backed by GAF nationwide national service.



Information Technology, Inc.
154 Wells Avenue, Newton, MA 02159
(617) 969-2100

phanumeric keyboards for data entry and inquiry. The record volume to date, according to reservations manager Gary Mulock, was 1,560 reservations in a single day. Since the hotel runs a double occupancy rate of 60% to 70%, the guest population routinely ranges from 1,900 to 2,200, he said.

As reservations are received, the information is encoded directly on magnetic disk storage. Later, during the off-line period, registration cards for use the next day are printed at the rate of 1,200 line/min. The system also generates reservation confirmations ready for mailing. And among the additional jobs done at this time is production of the next day's room assignments for maids.

Subsequently, as the maids make their rounds, they use Touch-Tone phones in the rooms to report conditions directly to the computer with three digit codes. Thus, at any time, a CRT display can respond with up-to-the-minute accuracy as to the number and types of rooms occupied, those available for incoming guests, those that will be needed later in the day and those that are out of service.

For the PBX room, which is staffed by up to seven operators, the computer

(Continued on Page 48)

Improved Response Gained

Decentralization Reduces Insurer's Entry Costs

Special to CW

CEDAR RAPIDS, Iowa — Life Investors Insurance Co. of America improved its response to agents and policyholders and reduced its operating costs by more than \$5,000 per month after decentralizing its data entry operations.

In January 1974, the company installed two System 1302 key-to-disk data entry systems from Inforex, Inc. with a total of 25 keystations to replace four keypunch machines, two verifiers and four intelligent terminals, according to Assistant Vice-President Clair McGriff.

Since that time, applications for Life Investors' policies have increased approximately 20% per year. Despite the additional workload, the company processes those policies in half the time previously required, with 50% fewer errors, and has shortened claims processing time by as much as two days.

A year after installation of the Inforex equipment, Life Investors upgraded to three System 1303 controllers with a total of 44 keystations distributed among 16 departments on five floors in its headquarters building.

"We had 11 keypunch operators when our data entry was centralized, but they could not keep up with the increased workload," McGriff recalled. "We were spending approximately \$1,500 per month for outside data entry services."

"Our data entry workload has doubled over the past three years, and if we had remained centralized, we would have needed twice as much equipment and would have had to add a third shift. We estimated our costs would have increased by about \$6,000 per month for both people and equipment," he said.

Life Investors required a greater number of terminals when it decentralized, because of the number of departments with work to handle. The company replaced centralized keypunch machines that were consistently in use with decentralized keystations that are used only an hour or two each day. The equipment allowed Life Investors to save money even though it installed a greater number of machines.

Since the decision to decentralize, two departments hired one additional person each to handle its data entry work load. Seven keypunch operators were relieved and the need for outside data entry services was eliminated. "When you combine our savings in personnel and equipment costs, I'd say we are saving around \$5,100 a month, including \$200 in the cost of punch cards alone," McGriff said.

Decentralization Popular

In addition to that cost saving, decentralization of data entry has put responsibility back into user departments, "where it belongs," McGriff said.

"I think that if I tried to centralize data entry now, the users wouldn't let me. They like that feeling of control over their operations that decentralized data entry gives them," he added.

Decentralized data entry increases efficiency by allowing more data entry time in each department, according to McGriff. Formerly, source documents

had to be delivered to the keypunch room for each department by 3 p.m. each day in order to be entered for processing by 5 p.m.

"Now that each department is responsible for its own data preparation,

Data Entry Dimensions

it has until the end of each work day to enter source documents. Each department has picked up between an hour and a half to two hours of extra time each day," he noted.

Two departments, credit life and new business, have established centralized data entry facilities of their own, assigning clerks full time to data entry tasks. In other departments, work is entered as it is received. For departments too small to justify a keystation of their own, three keystations have been installed in the former keypunch room.

"We bill each department for the services we provide, and when data entry costs rise above \$100 to \$150 per month, we suggest the department install its own keystation," McGriff explained.

Paul Fisher, assistant vice-president of the benefits and new business de-

partments at Life Investors, noted that decentralized data entry has reduced the number of steps involved in preparing data for the computer.

"We used to have to fill out coding sheets in pencil for each batch of source documents to be keypunched. The source documents and coding sheets were then routed to the data entry department."

"The time spent working on those code sheets was actually time spent on data entry, but now the coding sheets and the keypunching step have been eliminated. We key information directly from our source documents. That's one step to the computer, where

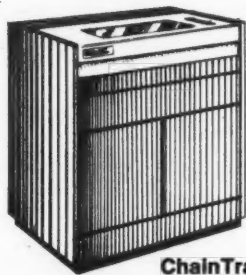
(Continued on Page 47)



The Printer Store

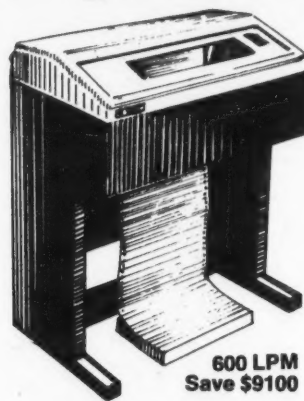
Digital Associates Corporation

PDP-11 USERS: Save up to \$9100 on your printer costs.



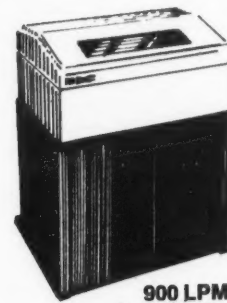
ChainTrain
Save \$8500

Switch to ChainTrain quality for \$8500 less than DEC's 600 LPM drum printer. Our model DAC 6644 is a 600 LPM ChainTrain letter quality printer that replaces the LP 11-YA and comes with PDP-11 interface, installation and maintenance.



600 LPM
Save \$9100

For maximum savings choose Digital Associates' DAC 2260, a 600 LPM plug-to-plug replacement for the LP 11-YA. You can save \$9100 under DEC's 600 LPM printer cost. It also comes with PDP-11 interface, installation and maintenance.



900 LPM
Save \$7500

For faster applications, the DAC 2290 is available. It is a 900 LPM plug-to-plug replacement for the LP 11-CA with savings of \$7500 under DEC's 600 LPM printer. Again, it comes with PDP-11 interface, installation and complete maintenance service.

PDP-11 USERS DISCOUNT COUPON

Pay to the order of:

Name: _____

Company: _____

Address: _____

Phone: _____

☐ I'd like more information on The Printer Store.

up to a
\$9100

savings on any DAC LP 11 replacement featured.

Similar savings are available on other printers at The Printer Store, world's largest independent supplier of printer systems.

Digital Associates Corporation, 1039 E. Main St., Stamford, CT 06902, Call Toll Free 800-243-9054

Helps Keep Budget Low Optical Scanner Scores High in School District

By Mike Ragsdale

Special to CW

CHATTANOOGA, Tenn. — The Hamilton County Department of Education here is solving its source data entry problems through the use of an optical mark scanner.

The school system has an enrollment of approximately 25,000 students but a very limited DP budget. Like many other educational DP shops, we deal with applications such as student attendance, bus reporting, grade reporting, student scheduling and student standardized testing.

Each one of these applications requires a high volume of input, fast

turnaround time and very little room for inaccuracy. The only reason we are able to meet these requirements with a limited budget and one data entry clerk is that we utilize optical mark source data collection.

A National Computer Systems, Inc. Century 7010 optical mark scanner installed in August 1976 has helped us keep our budget to a minimum. If we were to remove the scanner today, it would take at least three data entry clerks to replace it. The scanner's cost is one-third that of three data entry clerks.

The scanner has minimized data manipulation and computer reruns. It is intelligent and has off-line editing capabilities, allowing us to correct the information before it reaches the mainframe.

The scanner has met the require-

ments for fast turnaround. The speed of the scanner is approximately 3,000 document/hour. Before installing the scanner, it took three days to key and verify the student attendance and bus reporting information. Now the information is ready for processing in two hours.

The scanner has also met the requirement for accuracy. With its capability of 16-level read, it can determine the difference between an erasure and a valid mark.

We are no longer faced with the problem of keypunch errors — we are able to record information the user submits. Further, the scanner has met the requirements for student standardized testing. Before the installation of the scanner, our testing department was paying a service bureau to score and grade our standardized tests. This

service was expensive and sometimes took three months to send the results.

By utilizing the scanner's test scoring capability, we can process the same test for half the cost and produce the results in approximately two weeks.

Successful Utilization

We are now ending our second year of utilizing optical source data collection and have been very successful. We have found the scanner is not limited to educational applications, but only to the ingenuity of the user.

Presently, we are designing forms to collect data for our payroll, budgeting and accounting applications. We have plans to utilize our scanner for many other applications in the near future.

Ragsdale is DP manager for the Hamilton County Department of Education.



The Double-Duty Modem!

Omnitec Data's 1200B gives you the portability of an acoustic coupler and a fixed-installation data access modem in one compact package — all with the ability to transmit or receive at 1200 bps on a standard dial-up network — acoustically or with DAA. It's Bell 202C, S, DAA-CDT-1000A compatible, too, including EIA RS232C interface.

Check into the Bawdy 12 —
Write Dept. 424 or call
(602) 252-2083 collect.

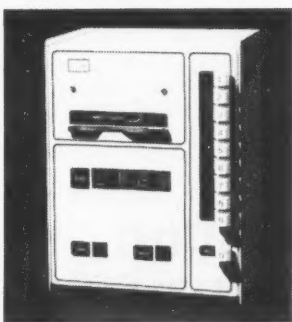


OMNITEC DATA
"New Dimensions in Modems"

2405 South 24th Street • Phoenix, Arizona 85034

\$mart Clock

The Leader in
Stand Alone Data
Collection Terminals



Data Collection For ...

- PAYROLL
- JOB COSTING
- INVENTORY
- SECURITY ACCESS

AND OTHER CUSTOM APPLICATIONS

cds coastal data
services inc.

1592 N.W. 159 Street, Miami, Fla. 33169
Telephone (305) 625-7123

Mixed-Media System Sews Up Orders

(Continued from Page 38)

when any of the several multiple-store options were involved, other options allowed salesmen to build size scales with quantities for size scales frequently ordered. Instead of writing all the detail quantities by size, they could enter a scale number.

The reduced writing and the options were a trade for the extra time required to complete the OCR forms. Scan-Data quoted a 10% reduction in writing speed to satisfy the OCR handprint requirements. A series of reports were designed to inform the salesmen on a weekly bases of the acceptances and percentage of rejects of the forms by character. This was designed to assist salesmen while improving acceptability.

The salesmen refer to this as their report card. Sales managers received summary reports for their salesmen. Any salesman that consistently exceeded 2% rejects was called in for a discussion on improving the quality of the handprint.

By January 16, 1975, the 2250/1 OCR system was operational. This same day marked the official release of the January selling line. From January 16, 1975, to the present, no fashion orders received in the scanning section of data entry have been carried forward. The backlog was eliminated. Each morning when management reviews the activity reports for the previous day, all data is current.

Key-to-Disk System Installed

In February 1975, the 2250/2 key-to-disk system was installed. The initial configuration included six stations, 4.4 million bytes of disk storage, 88K

bytes of CPU memory and a 9-track 1,600 bit/in. tape drive.

As on the OCR system, Scan-Data provided the initial application support and training.

In June 1975, the 150 Western, Work, Lady Lee and Ms. Lee salesmen began instruction in the OCR system. The same types of training methods were used for these salesmen as with the fashion group. Because of a difference in product mix, a different order form was developed. All the options presented to fashion salesmen were retained. In fact, several improvements were made, based on discussions with fashion salesmen.

In September 1975, the software for the marriage of the OCR and key-to-disk systems became available. To prevent future growth problems with the system, the decision was made to leave the systems separate. At that time, only eight key stations were recommended for a mixed-media system,

and a 10% degradation to the key-to-disk was quoted by Scan-Data to allow both systems to share a disk and tape. So officially, Lee has a mixed-media system that is really two separate systems.

In one year, the OCR system had eliminated the order backlog problem. The capacity of the OCR system allowed the data entry section to be reduced by 10 people and machines.

Continued use of the key-to-disk system permitted further reduction in personnel to the current staff of 15 operators and a supervisor.

In review, the features that made Scan-Data appear to be the best vendor in 1974 apply today. The OCR and key-to-disk systems continue to perform in a most satisfactory manner. The maintenance support in the greater Kansas City area is excellent.

Weaver is systems and programming manager for H.D. Lee Co., Inc.



'Microcomputer Association? ...
Just Down the Hall ...'

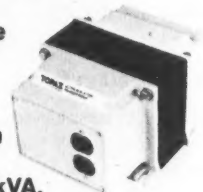
NOISE SENSITIVITY PROBLEMS GO AWAY— WE GUARANTEE IT!

Topaz Ultra-Isolation Transformers provide an inexpensive and reliable way to supply clean, noise-free AC power to sensitive equipment such as computers, instrumentation, communication and process control equipment.

Ultra-Isolation Transformers offer the industry's best noise attenuation:

- Common-mode noise rejection greater than 145 dB.
- Transverse-mode noise rejection greater than 125 dB at 1 kHz.
- Standard models 125 VA to 130 kVA.
- Priced from \$120.

Our guarantee: A Topaz Ultra-Isolation Transformer will solve your noise sensitivity problems to your complete satisfaction or we'll take it back—no questions asked.



TOPAZ
ELECTRONICS

SOLUTIONS TO
POWER PROBLEMS

3855 Ruffin Road, San Diego, California 92123—(714) 279-0831—TWX (910) 335-1526

NATIONAL —SPECIAL LEAR SIEGLER ISSUE— INFORMER

BIGFOOT TALKS!

April 24, 1978

HIGH-LEVEL COMMITTEE TO INVESTIGATE PROJECT X

**Ballistic Printer and
Dumb Terminal
Hooked
On Each Other**

Page 20

★ ★ ★

**Earth and Project X
On Collision Course**

Page 16

★ ★ ★

**Inside!
Exclusive Photos of
Secret Anaheim
Headquarters,
Home of Project X**

Page 11

★ ★ ★

**5 Warning Signs Of
Project X**

Page 9

★ ★ ★

**Think Dumb—
Bumper Sticker Inside**

Page 14

★ ★ ★

**Peripherals
Of the gods?**

Page 8



High-level investigative committee, spearheaded by Bill Terry, seen here in the process of questioning key Project X engineer Garry Strohmeyer. Strohmeyer refused to yield under committee pressure. INFORMER PHOTO

Several high-ranking officers at Lear Siegler, Inc. HQ have reportedly initiated actions that would force a full-scale investigation of its own secrecy-cloaked Project X.

Just yesterday, INFORMER sources learned that, due to uncertain publicity regarding the Project, certain high-level committee members want to find out just what is going on behind Project X's barred doors.

Bill Terry, the committee spokesman, told the INFORMER in a rare interview that "...Even we don't know what they (the engineers involved in Project X) are doing, and we intend to find out—for our benefit and for the

people's." Terry, when questioned more closely about just how much he *did* know concerning Project X, refused any further information, stating only "...if the committee action fails, the entire world will find out at the NCC (National Computer Conference)."

In the course of the interview, however, the INFORMER was able to confirm several rumors regarding Project X. Terry was unable to conceal the fact that Project X is busily developing devices that will

stun the computer industry, and totally dominate the NCC. Slips by Terry included allusions to new, smart terminals, highly intelligent terminals, astounding new printers, and even a mind-numbing terminal controller. But Terry's mysterious insistence upon total secrecy at this late date left many cryptic hints unexplained—and many nagging questions unanswered.

Rumors of a cover-up on the part of Project X are still unconfirmed, but LSI's strange reluctance to spill the beans, so to speak, give impetus to the notion. Without concrete evidence, the INFORMER must resort to educated speculation, but a noted scientist insists that LSI is even attempting a revolutionary breakthrough that (Please turn to page 6, column 3)

On-Line Agency Offers Libraries Unique Service

Special to CW

WESTWOOD, Mass. — Managing a diverse number of subscriptions to magazines can be one of the cost time-consuming and complicated tasks facing a library today. From the college library with as many as 30,000 magazine subscriptions to the business library with as few as 20, all libraries share common tasks — they must not only order and renew subscriptions, but also spend valuable professional time with related tasks such as address changes, discontinued or merged publications and breaks in service.

F.W. Faxon Co., an international library magazine subscription agency based here, has given over 18,000 customers a solution to problems with ordering and subscription control. The privately owned firm not only orders and renews subscriptions, but also offers a host of services covering all areas of serials librarianship from recordkeeping through budgeting.

All types of customers, including hospital, school and business libraries, avail themselves of Faxon's services. Faxon annually services over 1.3 million separate orders to 85,00 different magazines, journals, newspapers, newsletters and annuals that are published in more than 140 countries — and the firm is adding more than 100 new titles a week.

How does Faxon keep up with this kind of periodical explosion? With an automated computer system that it said is unique among library subscription agencies around the world. An

IBM 370/158 with over 2M bytes of storage is the center of Faxon's DP operation, it is accessed more than 40,000 times daily.

Through on-line procedures, some 200 Faxon employees process and service the libraries' subscription lists, sending individual prepaid subscriptions to periodical publishers and one complete invoice to library customers. These employees use a network of 130 CRT terminals, 48 of which are PTS-100 programmable terminals from Raytheon Data Systems Co. of Norwood, Mass.

The 48 terminals communicate via IBM 3270 protocol to the host mainframe through two Raytheon PTS-1020 terminal control units. Raytheon Model 3301 line printer provides Faxon with 300 line/min capability for programmer on-line testing and hard-copy inquiry for file folders and microfilm copies of canceled checks and orders.

Supplement Terminals

According to N. Bernard Basch, vice-president for systems management, the 96-year-old firm began automating its operation in 1958. "More than three years ago," Basch noted, "we decided to supplement our IBM terminal usage with Raytheon's PTS-100 terminals."

"We selected Raytheon terminals for a number of reasons — they offered good delivery and service capability and, most of all, the PTS-100 system offered us plug-to-plug compatibility for our IBM 2260s and, later, our

3270s at a 40% cost reduction.

"Another benefit of the Raytheon terminals," Basch added, "is physical size. The smaller PTS-100 helps us maximize our working area, and that's an added benefit that can't be easily overlooked."

In addition to these benefits, Basch also explained, the PTS-100 required no user training and provided the firm with features not available with the IBM 3270.

"We had come to appreciate our 3270 terminals over the years," Basch said, "but here was an opportunity for us to reap the same rewards, plus additional benefits, at a substantial cost saving. Raytheon has been very responsive to our needs, providing us with very strong vendor support. We have been quite satisfied with our merger of the two systems."

Applications for the PTS-100 system include accounts payable, accounts receivable, cash receipts, order entry, subscription renewals, claims and adjustments, as well as maintenance of a customer and title file that contains rates and full bibliographic data.

Order Entry Procedure

Subscription orders are entered on the terminals and then verified by operators. A customer history file data base is the hub of Faxon operations; all service depends upon, reacts to or updates information on each customer's list of titles.

Complete and carefully controlled records of all subscription transactions

are maintained on-line for at least three years.

A three-year history of all title activity on each itemized invoice will include such information as published prices, payments to publishers and check numbers.

"We have in excess of eight million customer invoice lines for the past three and a half years ready to display in the event of a service inquiry," Basch noted. "Cancellations, adjustments, and claims can all be serviced through CRT keyboard instructions. Over 85,000 titles with complete bibliographic data, price information and publisher restrictions of sale, if any, are immediately available upon operator command."

"Transmitting at speeds of up to 9,600 bit/sec, the PTS-100 system gives us the kind of responsiveness we need to provide our customers with the best service available," he added.

The computer produces orders for subscriptions and writes out payment checks to publishers, which are automatically collated, stuffed and postage-metered. The system then produces a single invoice that details every aspect of the account to the customer, listing periodicals title-by-title, prices, quantity, length of subscription and the library's controlled data for each title.

"Our data base file provides us with the information we need to serve our customers. In fact, the more complex it gets for us, the more flexibility we can

(Continued on Page 48)

Why EFM can offer you a lease proposal in 48 hours on this year's 3033, 3032 or 3031.

"Gentlemen, our leasing program is ready for the new 303X series of computers. The financing is in place. Our lease documentation is standard and easy to read. And, we have 10 years of experience behind us."

Truman Rice, President
EFM Computer Leasing

"True. But we should tell our customers and prospects all about the new EFM 303X leasing program."

"Rick, will you answer that?"

"303X deliveries have started. So let's go!"

"Right! Our present customers already know about our proven track record and unique computer leasing services."

Neil Glaubman, Executive
Vice President
EFM Computer Leasing

"What about our lease rates and upgrade provisions?"

Steve Zaleskie, Marketing Manager
EFM Computer Leasing

"Steve, our leases can provide for upgrading. And our rates are the best in the industry."

Rick Kohn, Executive Vice President
and Chief Financial Officer, EFM Group

"We're ready to deliver, too."

Neil, Steve and Rick — in unison

Just call (516) 488-7876 (collect).



EFM Computer Leasing, Inc.
A Subsidiary of the EFM Group
3000 Marcus Avenue, Lake Success, New York 11040

EFM Computer Leasing is a member of the Computer Lessors Association.

Insurer Decentralizes, Cuts Data Entry Costs

(Continued from Page 43)
we used to have two," Fisher said.

Life Investors had anticipated that its data entry error rate would increase after decentralization. Instead, the error rate has dropped about 30% overall and approximately 50% in some departments.

"There are several reasons for that error reduction," McGriff said. "One is that the person who keys each source document is now more familiar with that document than our keypunch operators were. Each person keys about three or four different documents now, compared with more than 200 documents for our keypunch operators."

"A second reason for the error reduction is the display screen on each keystation. Keystation operators, unlike keypunch operators, can see what they are doing. Third, each operator now knows that he is directly responsible for the accuracy of the data he enters. He can no longer blame errors on someone else," he said.

The data entry error rate has dropped despite the fact that verification by rekeyboarding, necessary in keypunch operations, has been eliminated, McGriff pointed out. "Verification is practical when batches of documents are entered all at once, but now, source documents are typically keyed a few at a time in each department."

Input and Output

Life Investors uses its 1303 systems for output as well as input. For some jobs it loads the processed data file from tape back onto disk on the 1303 to allow operators to search for and display certain

records.

"In the credit life department, for example, a computer edit run is loaded back into the system to become an error file," McGriff explained. "Keystation operators in that department can call up each incorrect record on the display screen, compare the displayed record against the appropriate source document and make the correction without having to rekey the entire record," he

said.

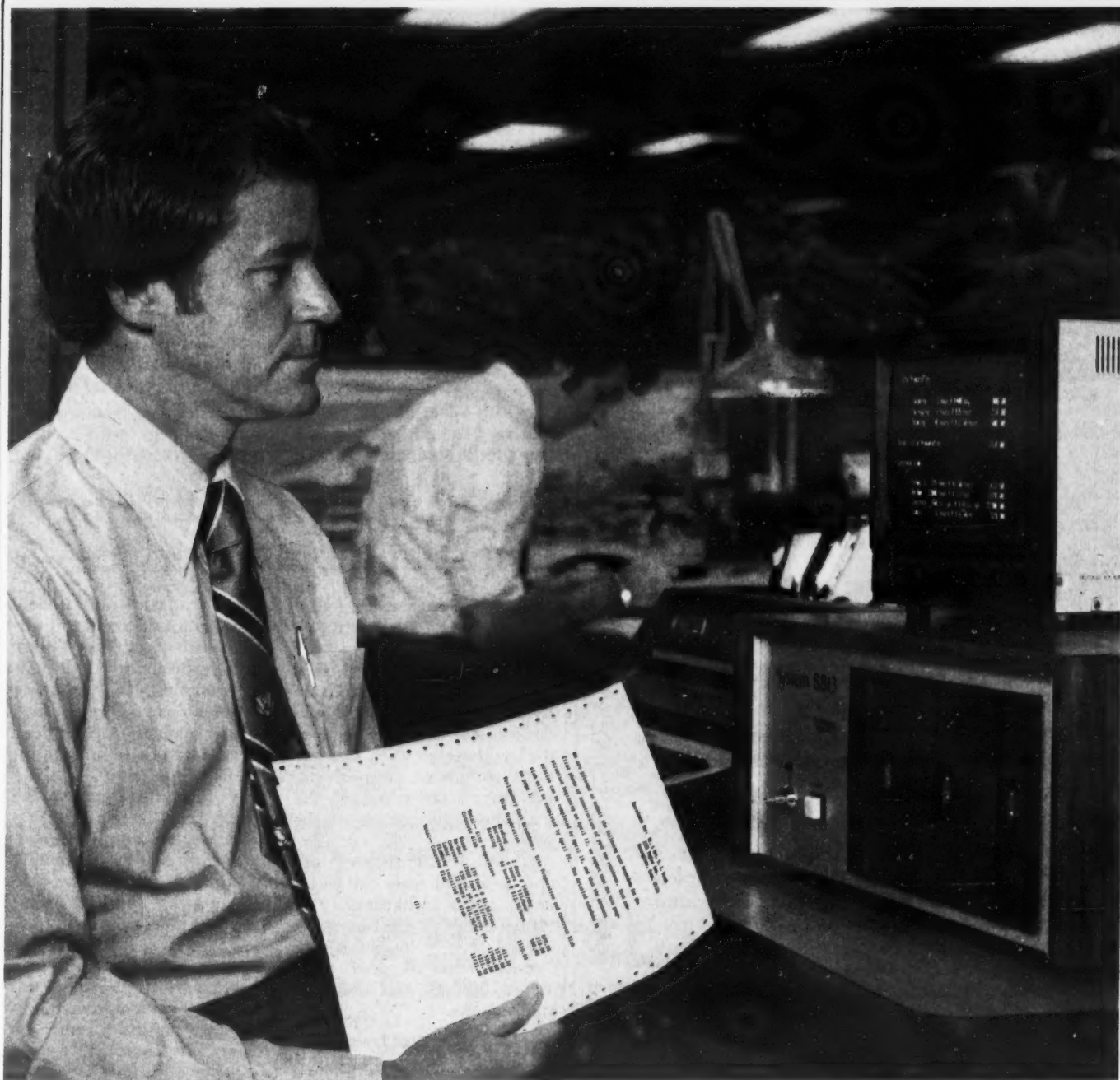
In the stockholder department, Life Investors keeps track of the number of shares bought and sold each day. The equipment allows it to maintain a month-to-date record of those changes without the expense of an on-line system. A clerk can call up that record on the keystation display screen rather than search each day's records manually to respond to an inquiry, McGriff noted.

He said Inforex was selected over other vendors because its equipment is easy to program. It had taken Life Investors' applications programmers 2-1/2 months to develop new business programs for the intelligent terminals replaced by the Inforex keystations.

The supervisor of that department programmed the 1303 to do the same jobs in three days. More than 140 display screen formats were con-

verted from the intelligent terminals to the Inforex keystations within three weeks by the department staff.

"All in all, decentralizing our data entry operations with the key-to-disk systems has allowed us to lower our operating cost significantly and to do our work faster and with better accuracy. That, in turn, allows us to be more responsive to our agents and our policyholders," McGriff said.



The Computer for the Professional

The 8813 was built with you, the professional, in mind. It quickly and easily processes cost estimates, payrolls, accounts, inventory, patient/client records and much more. You can write reports, briefs, and proposals on the 8813's typewriter keyboard, see them on the video screen, and instantly correct, revise, or print them.

Using the 8813, one person can process what would normally require many secretaries, several bookkeepers, and a great deal of time. And data storage takes a small fraction of the space used by previous methods.

You don't need to learn complicated computer languages. The 8813 understands commands in English. If you want to write your own programs, the 8813 includes a simple computer language, BASIC, that you can master in a few days. The 8813 slashes the professional's overhead. It's a powerful time and money-saving ally. Prices for complete systems including printer start at less than \$8,000.

See the 8813 at your local dealer or contact PolyMorphic Systems, 460 Ward Drive, Santa Barbara, California, 93111, (805) 967-0468, for the name of the dealer nearest you.

**PolyMorphic
Systems**



'What Do You Say We Go Out and Get Really Punchy?'

DEC®

300 & 500 Systems

G/L A/R A/P P/R O/E

Medical Billing & Report Generator
Dibol® Applications Software

**BUSINESS INFORMATION
SYSTEMS, INC.**

One Davis Blvd. Suite 509
Tampa, Fla. 33606
(813) 253-2796

® Registered trademark of
Digital Equipment Corporation

New Orleans Hotel System Eases Guest Billing

(Continued from Page 42)
produces a printout of guests and room numbers each morning and any time during the day. But that is used only for backup, manager Konnie Morrow reported. She said the operators rely chiefly upon five CRT terminals.

"When someone calls for a guest, we index the first four letters of the last name," she explained, "and the display screen shows us a listing of five guests. If the person being called isn't there, the operator calls for a second display and, if necessary, a third."

On average, she continued,

operators are able to give callers the desired room number in 5-10 seconds, a far superior response time to any previous method, she said.

"This is important," she commented, "because we handle 3,000 to 5,000 calls on an average day. And when the hotel is 100% full or when we have a citywide convention, the number has gone up to 15,000 a day."

Billing Procedures

In all the hotel's facilities, food and drink orders are pre-checked on NCR 250 electronic sales terminals. Remov-

able keyboard overlays provide prepricing for breakfast, lunch and dinner menus. This lets waiters and waitresses index a single key to trigger printing of both the item description and its price. Journal tapes and item counters in the terminals provide a detailed picture of the business done by each. This helps with menu planning and with staffing.

Except for room service, which uses the same machine for both procedures, transaction settlements are made on separate cashiers' terminals. These are on-line to the computer system, record room and city ledger charges on the magnetic files. Thus, at checkout time, there is no need for last-minute computations.

At the front desk, there is an additional terminal similar to those used in the food-and-beverage areas. This one is used to input miscellaneous charges and to make corrections and adjustments. When a clerk uses one of the on-line keyboard pads at the desk to index the room number of a departing guest, the bill is produced on a thermal printer.

Garrard noted that of the 12 front desk terminals, eight can

be used for checkout and all 12 can be used for registration. "We can reconfigure them to take care of any situation in a matter of minutes."

"One day, for example, we had 900 guests checking out at the same time another 1,150 were checking in, so we used all of the terminals to relieve the jam. If we really get pressed, we can also use the six CRTs in reservations to take the load off the front desk," Garrard said.

The hotel is also prepared for guests who arrive without reservations and for those who wish to change their accommodations. In those cases, CRT entry at the desk directs the computer to produce a registration card on a matrix printer there.

When they register, guests are given color-coded "passports" that list the public rooms and guest services available. Cash customers get green booklets, those using credit cards receive blue ones and those with city ledger or VIP accounts get gold ones.

The latter two permit guests to fill in their credit card or charge account numbers and

the address to which they want the bill sent. Then they may drop the passport and key into a special box in the lobby. Bills are mailed within 24 hours. The system is so popular, Garrard said, that it has been used by as many as 325 guests in a single day.

Impact Assessed

In summing up the impact of the on-line system, the hotel's former DP manager said "the single entry of the reservation information sets up everything that follows. You don't have to worry about late charges because there aren't any. And you simplify front-desk operations even while the automatic posting of room charges and taxes eliminates the need for a night auditing staff."

"The system provides for maximum efficiency and it minimizes paperwork with attendant savings in time and labor."

"Perhaps best of all," he concluded, "you have control of your hotel at any given time. The CRT screen can tell you how many rooms have been sold, how many remain in inventory and how many reservations you have yet to fulfill."

Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT — ELIMINATE DOWN-TIME caused by field conversion

We will purchase your IBM 800 1600 BPI drives now & install 3420-4, 3420-6 drives immediately from inventory.

Call Nick DiBari
312-698-3000

or your nearest Comdisco office

COMDISCO

PDP-8E, 11/04, 11/34, 11/35, 11/45, VT50, VT52, VT71,

digital

Now you can get factory refurbished equipment for the same price as used.

If you've been looking for a bargain, we've got the bargains you've been looking for:

- Complete systems
- Processors
- Peripherals
- Accessories

All Digital equipment. All with complete documentation. All quality tested and warranted by the people who made them.

To find out how much you can save, call toll-free* any time between 9:00 a.m. and 5:00 p.m. EST 800-258-1728. *(New Hampshire residents call 603-884-5736.) Or clip the coupon and send it to Digital Equipment Corporation, Traditional Products Group, 125 Northeastern Boulevard, Nashua, New Hampshire 03060.

Digital Equipment Corporation,
Traditional Products,
125 Northeastern Boulevard,
Nashua, New Hampshire 03060.

- ☐ Please send me more information.
☐ Please call, I'm specifically interested in:

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

CW4248

11/35, 11/45, VT50, VT52, VT61/t, VT71, RP04, RP05,

On-Line Service Offering Unusual Library Service

(Continued from Page 46)
give our customers," Basch said.

"Each order and check sent to a publisher is electronically filed. After our bank records the transfer of funds, we further update our files to show this completed transaction. We then have proof of the publisher's acceptance of the order."

"Over 20,000 ship-to and charge-to addresses can be located either alphabetically or numerically in our customer service file," Basch noted, "which helps us verify customer billings and shipping instructions."

Order Control Device

"Once an order is entered into the order processing system, each department must complete its unit of work and release the order to the next workstation. This 'sign-off' or order control device allows location of an order for last-minute changes and assures us that all targeted completion dates will be accomplished," Basch explained.

In addition to its other services, Faxon will automatically try to obtain a common expiration date for all subscriptions; will consolidate billings, billing in whatever time sequence the customer selects; arrange for duplicate sets of periodicals to be bound; request sample copies for a

library's consideration; update all records and contact publishers when address changes occur; provide three-year price studies for budgeting purposes; and supply punch cards or magnetic tape with all of the data shown on the invoice.

"By bringing data to the source from which it originates, we've increased our accuracy, as well as the quality of our service, and are processing twice as many orders daily. Our error rates have gone down substantially because of our ability to logically and visually check data as it is entered. That's a tremendous saving for us and for our customers," Basch noted.

In providing its many services, Faxon has enjoyed an impressive growth in annual dollar volume which has increased 150% in the past six years. Faxon has achieved this kind of success by controlling its operation costs, virtually eliminating all manual methods of operation, Basch said.

"Our customer services have become increasingly diversified, reflecting the professional standards necessary to meet the demands, requirements and expectations of the library community. Thanks to our automated operations, we're able to personalize our services to meet individual customer requirements."

KD (402) 392-2606
VOLUME DATA ENTRY SERVICES...
TAPE OR CARDS
"QUALITY AT A LOWER COST"
AMERICAN KEYDATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

2 days.
Software:
how to buy it

How to evaluate and select commercial software packages to fit your organization's price, performance, and application needs. This seminar will show you, step by step, how to make software selection/acquisition decisions that can save you tens of thousands of dollars.

Enroll now for:

- New York: May 11-12
- San Francisco: May 18-19
- Chicago: June 22-23
- Washington: July 6-7
- Philadelphia: July 20-21

for
FREE COURSE OUTLINE
and full schedule of EDP seminars, call
800-257-9406

datapro

1805 Underwood Blvd., Delran, NJ 08075
In N.J. call 609-764-1100

INFONATIONAL

WILL PUT IT UP



We can help you put it up with:

- PROVEN SYSTEMS
- PROFESSIONAL TRAINING
- COMPLETE DOCUMENTATION

RUN WITH THE BEST IN INTEGRATED ACCOUNTING SYSTEMS

INFONATIONAL

A Division of United Computing Systems, Inc.

For the most cost-effective, easy-to-operate, integrated accounting systems, call (714) 560-7070 or mail in this coupon.

INFONATIONAL

A Division of United Computing Systems, Inc.

6626 Convoy Court
San Diego, CA 92111
(714) 560-7070



NAME: _____

TITLE: _____

COMPANY: _____

ADDRESS: _____

CITY: _____

STATE: _____

ZIP: _____

PHONE: _____

424 78

I AM INTERESTED IN:

- ☐ GENERAL LEDGER
- ☐ ACCOUNTS PAYABLE/
PURCHASE ORDER
- ☐ FIXED ASSETS
ACCOUNTING
- ☐ ACCOUNTS RECEIVABLE/
SALES ANALYSIS

Fast, Accurate Technique School District's Scanner Does Variety of Jobs

By Richard H. Wollaver

Special to CW

PHILADELPHIA — The school district's administrative DP center here supports a pupil population of 250,000 and a work force of 37,000. Data entry is naturally a significant part of the support task and scanners have been employed successfully to ease the problems associated with getting this wide variety of data into various files.

In past years, all data was converted by traditional keypunch machines. This situation has changed so that now we key everything on key-to-disk equipment. Using this method, accuracy and speed have both increased.

But still unable to keep up with the ever-expanding workload, the school district began using scanners.

The first to be used were Opscan

Data Entry Dimensions

Systems, Inc. and IBM 1232 equipment. These systems were adequate, but still too slow and inaccurate. In 1972, the district placed a National Computer Systems, Inc. (NCS) Sentry 70 mark-sense scanner system on long-term lease. This system is capable

of reading 6,000 sheets per hour and entries can be made on both sides of a sheet and read on one pass. Accuracy is very high and software permits new applications to be easily developed.

This system replaced the old Opscan and IBM equipment and permitted us to do in-house scanning of the city-wide test program given each year to all pupils. Scanning is done in-house for all grades five through 12, with the K-4 test booklets still going out to a specialized vendor. The testing application was the one job that forced the district to the NCS and since then, numerous other applications have been developed.

We are presently handling all the

payroll input for our per diem teacher work force, which involves some 5,000 employees every two weeks. Since this is a positive reporting system, the workload in data entry would be difficult to handle, but with the scanner we have no problem meeting time and accuracy requirements.

Business Applications

All employee expense reimbursements are also handled with the scanner and more than 1,000 of these are easily processed each month. Various other business applications have also been developed using the NCS system.

All high school grades for some 60,000 pupils are submitted on turn-around documents preslugged on our IBM 370 and scanned by the sentry 70. Accuracy levels are very high and we are able to meet our production deadlines with this process.

In 1976, an Opscan 37 character reader was also placed on rent in an attempt to further reduce the demands on the data entry group. While more difficult to implement because of the need for 10-pitch typewriters, this hardware is beginning to show good results. It is expected that 30,000 to 35,000 complicated personnel documents will be processed through this machine as well as all teacher certification updates.

All in all, the use of scanning has proven its worth. The data entry section has not expanded in five years; in fact, it has grown smaller. More can be done, and we expect further improvements.

Wollaver is DP director for the Philadelphia school district.

NCC '78 THE RECORD BREAKER

The 1978 National Computer Conference, June 5-8 in Anaheim, promises to be the largest and most diverse computer conference and exposition ever held. NCC '78 will combine the biggest with the best with a number of new NCC records expected... the largest exhibit of computer products and services ever held; total conference attendance of up to 40,000 computer specialists and information processing users; plus a Personal Computing Festival which will provide a unique national forum for this fast-growing field.

NCC '78 will be a rewarding learning experience for anyone with a need to know about the latest developments in computing and information processing. The conference exhibit program will be the largest single display of computer hardware, software, systems, and services ever staged. All exhibit space for NCC '78 is sold out, with more than 330 organizations reserving 1,382 booths — surpassing the previous record of 1,146 booths set at the '77 NCC in Dallas. More than ever, NCC will be an extraordinary showcase for the latest developments in computing with over 4,000 industry representatives on hand to demonstrate their latest products and services, provide technical and commercial data, and to help you find solutions to your specific needs.

The Personal Computing Festival will be the most exciting event of its type ever held. The Festival marks

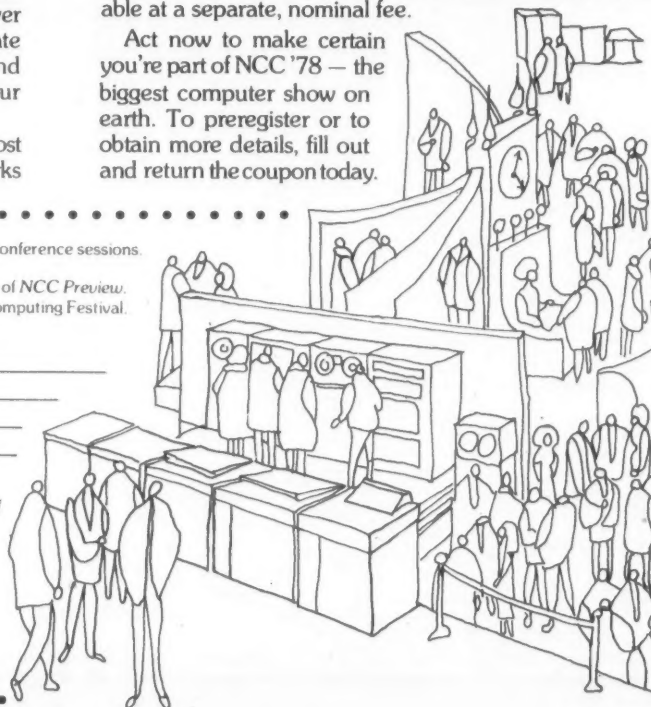
a first for NCC — a major conference within a conference with its own program of approximately 30 sessions, commercial exhibits of consumer computer products and services, and a contest featuring "homebrew" microprocessor systems, devices,

and applications. All Personal Computing Festival activities will be held in the Disneyland Hotel Convention Center, just a few minutes from the Anaheim Convention Center.

And there's much more. A technical and professional program of some 100 sessions will cover new frontiers in computer methodology, applications, systems, and societal concerns with emphasis on practical applications and current issues rather than on theoretical concepts. Special attention will be given to how the use of computers can help alleviate the national energy problem. In addition, a Professional Development Series of 15 seminars will feature topics critical to increasing professional skills and aiding in career development. Each seminar will be available at a separate, nominal fee.

Act now to make certain you're part of NCC '78 — the biggest computer show on earth. To preregister or to obtain more details, fill out and return the coupon today.

CPTW



Module Backs Microfilm Users

ROCHESTER, N.Y. — Eastman Kodak Co. has introduced an interface module for computer-assisted retrieval of information stored on microfilm that reportedly links IBM 3277 CRT terminals with Kodak's Recordak Microstar reader Model PR-1 and the models IC-5 and IC-5P image control keyboards.

The interface module permits parameters to be entered into the terminal and conveyed to the microfilm reader, according to a spokesman. The reader is linked to a host computer that scans the stored image index information and returns the location data to the terminal.

The interface is priced at \$2,000 and will be available in the third quarter from Kodak, 343 State St., Rochester, N.Y. 14650.



"What Do I Do? I'm an Analyst — But They Won't Tell Me of What."

- ☐ I wish to preregister for NCC '78 and have enclosed \$60 covering conference sessions, exhibits, other activities, plus preregistration benefits.
- ☐ Please send me all the facts about NCC '78, including future issues of NCC Preview.
- ☐ My company is interested in exhibiting at the NCC '78 Personal Computing Festival.
- ☐ Please send me information about the NCC '78 Travel Service.

Name _____

Company _____

Street _____

City _____

State _____ Zip _____

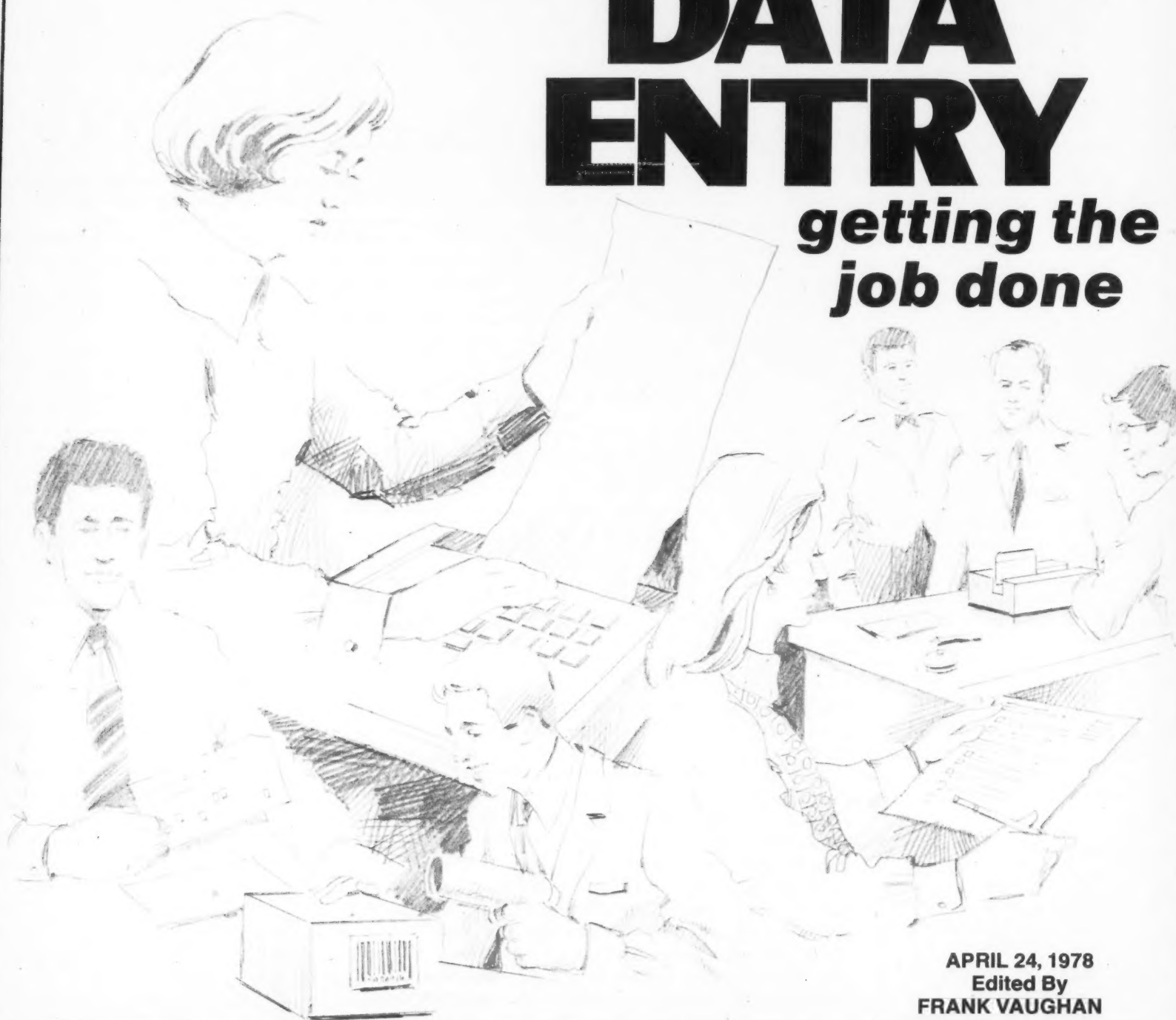
NCC '78...
**New Frontiers in
Information Processing**

c/o AFIPS, 210 Summit Avenue
Montvale, N.J. 07645
telephone: 201/391-9810

Computerworld Special Report

SOURCE DATA ENTRY

*getting the
job done*



APRIL 24, 1978
Edited By
FRANK VAUGHAN

Recognition Sought

Dema Striving to Meet Data Entry Challenges

By Norman Bodek

Special to CW

GREENWICH, Conn.— If you have a professional involvement with the collection, management or entry of data, the Data Entry Management Association (Dema) may be of interest to you.

Dema's prime goal is to achieve proper recognition for the data entry operation within the business community. Members of the organization believe data entry management people are truly professionals and are entitled to all of the benefits derived from their profession.

Dema's current membership is comprised of more than 600 top data entry

professionals from industry, government, education and service areas.

Data entry and collection encompasses 30% to 50% of the average DP budget, but probably receives only 2% of its deserved recognition. Dema hopes to balance the scale along with today's rapidly advancing technology.

The dichotomy between the "sophisticated" computer and the "factory" keypunch has disappeared. Today, data entry is no longer the keypunch. Instead it is:

- On-line interactive terminals.
- Minicomputer key-to-disk systems.
- Optical character recognition (OCR) and mixed-media systems (OCR plus key-to-disk).

• Tablets, pads, wands, magnetic card readers.

• Distributed networks.

• Key-to-diskette and key-to-tape systems.

Man Vs. Machine

Above all, data entry is responsible for the area of man vs. machine: the interfacing of people with machines, the management of people and the responsibility for the integrity of the data being captured.

People vs. machines. We do have a choice. We can use the machine as a tool, as a benefit for the development of man or we can become the instrument of the machine.

Like the machine, we can become impersonal, unloving, callous and totally objective. Unfortunately, too many computer installations have allowed the machine to dominate. People working in its environment seem to lose many of the human elements and become like the machine.

As management, we are concerned with properly utilizing the latest technological equipment to its fullest. We want to capture data accurately with proficiency.

Yet, while we recognize our obligation to be accurate and produce data at its lowest cost through higher productivity, we believe working hard is not a contradiction of our humanity. We can work hard and produce to our fullest while still developing the higher aspects of our humanistic selves.

Data entry is primarily the profession of managing people and is concerned with:

- Hiring and training.
- Supervision.
- Motivation, job enrichment and job development.
- Interviews and evaluations.
- Compensation.
- Cost control and budgeting.

The difference that existed a few
(Continued on Page S/20)

Persian Data Problem Solved

Right-Left Language Scanned 'by Number'

By Thomas Jaycox

Special to CW

TEHRAN, Iran — The data collection problem in the U.S. and other developed nations has, in recent years, been solved to a great degree by advanced technology and the introduction of optical character recognition (OCR), magnetic ink character recognition (Micr) and similar devices, but not so in a developing country such as Iran.

In Iran, where computers were first introduced 10 to 15 years ago, the ancient abacus still reigns supreme. For every computer or hand-held electronic calculator in use in the U.S. today there are at least 100 (if not 1,000) abaci functioning in Iran just as they have been for the past five centuries.

For the less than 100 computer installations that do exist, data collection is still the No. 1 problem.

Other problems relating to the study, the design development and the implementation of automated data processing systems in Iran have to do with the language of the country, which is Persian (Farsi). Farsi is an Arabic script type of language completely unlike our own or any other Roman/Latin-based language.

In addition, Farsi is written and read from right to left, just the opposite of English.

Of course, one way to solve this language problem is to develop systems to process English data only (and most systems developed in Iran do just that). But even though English is the second language of the country, how are such systems worthwhile when less than 3% of the population can speak or understand English?

For any automated DP system to serve the purpose for which it was intended, it must be able to process data in the language of the country, and if new problems and obstacles are presented, they will have to be overcome.

For the past 20 months, my colleagues and I (most of them, like myself, are from the U.S.) have been engaged in a project to automate the Imperial Iranian Gendarmerie. The Iranian Gendarmerie carries out in Iran many of the law enforcement functions performed in the U.S., by such arms of the law as the county sheriff, the state highway police, the Federal Border Guard Authority and

the Treasury Department. It has responsibility for keeping the peace in the rural areas of the country, patrolling the country highways, protecting its borders against illegal entry and apprehending smugglers.

The National Police, on the other hand, have responsibility for main-

taining law and order in the urban areas (all cities of 5,000 population or more).

First Application

The first application for the Gendarmerie was the automation of traffic
(Continued on Page S/8)

Source Data Entry Seen as Step to DDP

By Gerald R. Doctor

Special to CW

Source data entry is becoming a first step into a distributed processing environment for many users. Although a move to source data entry — the utilization of data capture equipment right in the business environment — does not require a headlong plunge into distributed data processing (DDP), well-planned first steps will provide a solid foundation for future growth in that direction.

For computer users unable to move from centralized to distributed processing for various reasons, source data entry becomes an interim measure that

allows them to reap the benefits of intelligent preprocessing of data and timeliness of the entry process.

Some significant benefits of DDP are more timely data, more valid data, improved management control over decision making and increased responsiveness to customers. Since data entry is such a large part of DDP systems, any source data entry system will partially achieve some of these benefits and begin to bridge the user into a more extensive structuring of processing operations.

The functional benefits of a fully distributed system — such as common data bases, compatible languages, un-

ified communications protocols, load sharing and broad access to information — can be achieved via a growth process which involves source data entry as an initial step. For the potential source data entry user, this transition may not appear to be so easy. Let's look at some of the problems he faces today.

The traditional data entry process usually involves the following steps: data generation, transcription, capture, formatting, verification, editing and, finally, computation. This method of operation means the user is confronted with a series of discrete steps along the
(Continued from Page S/24)

On the Inside

Dema Striving to Meet Data Entry Challenges.....	S/2
Right-Left Language Scanned 'By Number'.....	S/2
Source Data Entry Seen as Step to DDP.....	S/2
European Data Entry Methods Accent People.....	S/3
OCR Unit Captures Workers' Time Card Data.....	S/4
Portable Data Entry Pleases Supermarket Chain.....	S/5
Firestone Breaks POS Data Collection Bottleneck.....	S/7
Diskettes Spare Paperwork for Bowling League.....	S/10
Yale Saves Annual \$25,000 With Key-to-Disk.....	S/11
Scanner Helps School District in Bus Purchase.....	S/13
Key-to-Disk Speeds Check Imprinter's Work.....	S/14
CRT Net Keeps Pace With Hospital's Growth.....	S/15
Data Entry Net Eases Air Force Acquisitions.....	S/16
OCR Solves Huge British Data Entry Problem.....	S/21
Wine Sellers' Portable Terminal Cuts Phone Bill.....	S/28

European Data Entry Methods Accent People

By Frank E. Taylor
Special to CW

MANCHESTER, England — Here in Europe, the relative costs of labor and equipment are still somewhat different from those in the U.S., and there is still considerable accent on techniques for any job that involves a balance between the use of labor and the investment of capital to produce a least-cost facility.

This is most certainly true in the data entry field, where there is almost certainly more accent on systems that use personnel as transducers between the process of data capture and its entry into a system. There is an increasing trend for such personnel to be line staff performing other functions — a point explored further in this article.

First, it is relevant to examine data entry in perspective.

In any processing system, means must be provided for the entry of data which satisfies the objectives and functions of the overall system, these relate in turn to the activities of the end users served. The data entry technique within any system must be capable of handling the volumes of data in the system, within a time scale determined by the end use of each data set entered. And of course, it must present accurate, correct data to the processing facilities. A further requirement is integrity — ensuring that all the data and no less or more than intended, is processed.

Here in Europe, there is probably less accent on security than in the U.S., and integrity is probably not attracting as much attention as it is across the Atlantic. However, more and more organizations are beginning to realize that the personal link in a data entry system is rather critical and should be quickly reviewed on a regular basis. Such reviews include examination of alternative entry methods. These will be explored in outline and then in relationship to the European scene.

Data Entry Methods

The means used for data entry subdivide naturally into two main classes: general-purpose techniques (almost always associated with a keyboard and some form of transducer that can be used to enter almost any kind of keyboard-compatible data and special purpose techniques (restricted to handling certain types or classes of data or data prepared in a certain way).

Examples are optical mark reading, optical character recognition and magnetic ink character recognition.

This class also extends to other specialized techniques such as point-of-sale (POS) terminals or production control systems that often use special-purpose equipment, such as optical mark readers or badge readers, in combination with a nonstandard keyboard.

Much of the equipment used here for special-purpose data entry is imported from the U.S., although European equipment is being manufactured for POS terminals and production control terminals.

However, in light of the fact that labor-intensive data entry methods are likely to be familiar in Europe for some years to come, a considerable amount of effort is going into the standardization of both coding and graphics.

New international alphabet standards are likely to be proposed by one or

more of the European national-standards bodies in the next two to three years.

In some environments, conditions do not favor the use of personnel — for example, in systems where a 24-hour service is offered or in hostile environments. Process control computers for many years have been incapable of ac-

cepting information input directly from transducers via wide links. Direct data entry has advantages: several of the steps incurred within the data entry activity are eliminated, such as human verification and document batching. The advantages first appeared here four or five years ago in the form of packages available for certain manufacturers' mainframes.

While such packages were poten-

'Data retention will probably increase in importance as it will reduce the need for general-purpose data entry involving keying, which is likely to become more and more expensive as staff costs rise. This may well be Europe's alternative to the specialized data entry methods that have gained favor in the U.S.'

tially very useful, the basic problem was that they occupied valuable channel capacity on an expensive mainframe. The emergence of minicomputers and microprocessors has led to the migration of the processing capa-

bility from such mainframes, to small computers located where the required processing capability is often found. The key to the effective application of such devices is the design of user dialogue. Because of the labor/investment balance, user dialogues have probably been developed more intensively here in Europe than in the U.S., and it is perhaps relevant to review its development.

Three differing techniques for the design of dialogue have been used successfully to date — these techniques match differing system requirements and differing user skills. The first involves use of the "fill-in-the-blanks" technique, in which a carefully designed format on the screen allows the operator to fill blanks within that format, while at the same time checking that the keyed characters are valid. In many cases, characters are validated against a prestored record of field

(Continued on Page 5/12)

RESPONSE TIME MONITOR

for multidrop terminal networks.

MONITORS RESPONSE TIME on asynchronous and bisynchronous multidrop terminal networks.

DISPLAYS minimum, maximum, last transaction, number of transactions and maintains running average on 4-digit LED display.

DATA RATES from 75 to 9600 baud.

TERMINAL CONNECTION via optical coupler or RS-232C bridge.

RESOLUTION is 0.1 sec. with 9.999 sec. possible.

All packed into one self-contained, self-powered monitor, the

MODEL 300

\$1500 F.O.B. Salt Lake City, Utah

Manufactured and serviced by:

QUESTRONICS, INC.

3565 South West Temple, #5
Salt Lake City, Utah 84115
(801) 262-9923

Puzzled About Your Data Entry Needs? CUSTOMIZE!

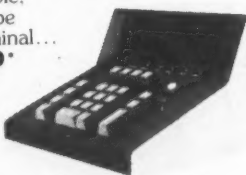
with Custom Terminals Corp.

We design & manufacture products to solve specific needs. Operational flexibility, simplicity, ruggedness & **low cost** are built-in! Let us design a terminal/ peripheral system just for you. Point-of-sale; back room (inventory); factory-floors; or any special application.

CUSTOM TERMINALS CORP.
225 OSER AVENUE, HAUPPAUGE, N.Y. 11787 • (516) 231-3111

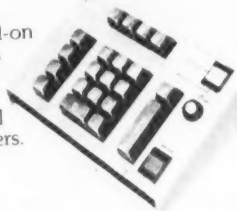
TR-10

Low cost, reliable, factory floor type data entry terminal... **around \$900*** Available with badge readers, journal printers, customizable keyboards, and displays, etc.



KB-8

Numeric Pad add-on for all peripherals and terminals... **around \$300*** Interfaces with all CRT's and printers. (Customizable keyboards)



TR/B

Special purpose multi display data entry terminal... **around \$2000*** Used with mini computerized-conveyor systems, etc.



*Typical, small quantity, end user prices

For Government Contractor

OCR Unit Captures Workers' Time Card Data

COLLEGE POINT, N.Y. — Optical character recognition (OCR) has now been extended to gathering production data from the plant floor at EDO Corp. here, where workers' time cards are actually OCR forms.

Employees print elapsed time and production information on the cards, which are then processed on an OCR

stone," Charles F. Anderson Jr., vice-president of financial and administrative services, said. "We're getting bills out faster, which improves cash flow, and we've cut administrative costs. Equally important, we've generated a new awareness of the time card, the most basic of all production documents, that is effectively the employee's paycheck and the company's basis for charges to customers."

The OCR time card, made out by both salaried and hourly employees, has resulted in net savings of about \$23,000 a year — including the cost of the new forms, which is less than the old cards. And that is just the beginning, since OCR processing has since been extended to three additional applications, with more planned, he explained.

Fast and accurate capture of production data is particularly important to EDO, because a major portion of its work is for the federal government.

The company dates back to 1925, when Earl Dodge Osborn used his initials to name his EDO Aircraft Corp., which built and tested seaplanes and aircraft floats in a plant adjacent to Flushing Bay.

Today, EDO is a \$53-million-plus organization employing more than 1,600 people worldwide. The Government Products Division produces a range of equipment from various sonar systems to fuel-tank jettison release mechanisms.



The IBM 370/135 CPU at EDO Corp. will soon be upgraded to a Model 138.

reader that captures the data in a matter of seconds, compared with the 10 minutes previously required for keypunching and verifying, according to a spokesman.

"We've killed three birds with one



If the OCR reader can't read a number, it stops and flashes that number on the 3277 screen. The operator then enters it through the keyboard.

The Edo-Aire Group makes products for the general aviation industry. The Commercial Products Group serves the offshore oil and gas industry, produces industrial ceramics, airborne television and fiber optic recording equipment, rotating components for the computer peripheral and instrumentation markets and fiber-reinforced composites for the aircraft and aerospace industries.

The firm's experience with automatic DP methods dates back about 35 years to punch card machines. Currently, EDO is using an IBM 370/135 with 256K bytes of memory.

The Management Information Systems Department serves all EDO divisions and groups, with the largest workload coming from the Government Products Division, whose main plant is here. More than 750 plant and office employees are involved.

Controls Needed

The major impetus for changing production data collection methods stemmed from the need to produce management reports faster and to get bills out faster at the end of the month. Time cards had been processed weekly, with the cards filled in by employees, then keypunched to enter the data into the computer. This was changed to a daily cycle that speeded the reports but not to a same-day basis. Controls were still not tight enough to suit management, particularly on cost-fixed con-

tracts, and the keypunch workload was significantly increased.

EDO considered an on-line data collection system, but start-up costs were felt to be too high. More important, it would have meant a drastic change for the employees, many of whom have been with EDO 30 years or more.

"We decided on OCR because we felt it would be easier on the employees and would also get us the improvements we needed," Robert E. Schmand, manager of management information systems, said.

"We were aware of the potential difficulties, since the machine would have to read numbers hand-printed by hundreds of individuals — sometimes leaning on a shearing machine or other production equipment. But our people were used to writing information on cards, and our studies showed the technology had reached the point where we could make it work," he said.

Document design is critical in OCR processing, so Schmand and his staff worked closely with IBM and forms companies, designing a number of potential forms. The new time reporting form finally selected has space for the employee to enter four separate production steps, or charges. Most cards average 2-1/2 charges; if there are more than four, a second card is used.

There is space to enter a job number, actual and/or premium hours worked, department and class (direct or indirect

(Continued on Page S/26)



the Data Entry Management Association

16E Weaver's Hill, Greenwich, CT 06830
(203) 531-4036

Opportunities multiply with the advance of technology. So do the **challenges** and the need for continuing education.

DEMA is the association of data entry management specialists. It recognizes and addresses the members' concerns and their need for specialized information.

Your DEMA membership offers the following ways to share the most current and comprehensive body of Knowledge in Data Entry.

- Monthly newsletter
- National conference
- Regional seminars and workshops
- Training aids and professional papers

Topics of interest covered:

New Equipment Evaluation	Hardware & Software Techniques
Scheduling and Control	Documentation
Hiring & Training	Motivation
Conversions	User Interaction
Interviews & Evaluations	Standards & Incentives
Compensation	Accuracy & Speed
Cost Control & Budgeting	Designing Records & Forms
Distributed Data Entry	The Future of our Profession

Take advantage of these opportunities. Prepare for the challenges. Join **your** professional organization.

APPLICATION FOR MEMBERSHIP

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Costs: Annual membership fee — \$45.00 for the first member from one company, \$25.00 for each additional member from the same department.

☐ Check enclosed ☐ Please invoice my company

☐ I am interested in Regional Seminar of DEMA — May 11th & 12th at the Hospitality Inn, Columbus, Ohio.

☐ I am interested in Annual Data Entry Management Association's Conference at Sheraton Harbor Island Hotel, San Diego, California October 30th—Nov. 1st



Robert E. Schmand (right), manager of management information systems at EDO, discusses work flow with operations manager Andrew J. Currie.

Portable Data Entry Pleases Supermarket Chain

Special to CW

COMPTON, Calif. — Ralphs Grocery Co., a California supermarket chain, was one of the latest grocery chains to adopt an electronic ordering system using portable data entry terminals. But when it did, it went all out. The positive effects of that decision have been startling to even the most optimistic executives at Ralphs.

For years, Ralphs had relied on the mark-sense punch card system to do its ordering. Late in 1976 the Los Angeles based chain, which now has 101 stores, began testing MSI Data Corp.'s Source 2200 equipped with an optical wand scanner. Early in 1977, the company elected to switch over completely to electronic ordering and took delivery of 115 Source 2200s.

Within 12 months, the terminals have paid for themselves, cutting the costs of writing orders by 65%, according to Roger Borneman, Ralphs' vice-president for administration.

"We've had some problems," Borneman said, "but the new system has caused substantial expense savings."

It should be noted that Ralphs' electronic ordering system complements but isn't a part of the electronic cash register and scanning systems the chain is installing at its checkout stands.

Orders recorded by the MSI terminals are transmitted via standard telephone circuits to one of two MSI Model 3040 receivers at Ralphs headquarters' computer center here, and, after editing, are processed by the company's IBM 370/158.

When Ralphs decided to adopt electronic ordering, it had planned to use the shelf-tag scanning feature of the new system only for grocery and deli items and to key the orders for meat and produce. This approach was planned to retain the meat and produce order history that was a feature of the old mark-sense card order system.

Shortly after Ralphs began using MSI's terminals, the company decided to try combining the old and the new by adding a scannable bar code for meat and produce items to a new version of its order book. This worked well, Borneman said, and the system was further expanded to include what Ralphs calls "expense items" — uniforms, mailing supplies, forms, even the paper bags used to pack customers' purchases.

Labor Savings

"We had projected labor savings of 60% in the writing of grocery and deli

orders alone," Borneman said. "When we expanded it to include meat, produce and other items, our labor savings reached 65%."

In converting to electronic ordering, Ralphs eliminated most of the cost of the courier service it had used to pick up mark-sense cards and some equipment and supplies used with the former ordering system. But of the total amount saved, 95% was in store labor, Borneman noted.

In disclosing that the MSI terminals had paid for themselves in less than a year, Borneman declined to quantify the total dollar savings realized through electronic ordering. But he did say the pay-out took into consideration all development costs, including systems and programming effort, as

well as equipment costs.

Borneman was quick to add that the labor savings was only a part of the benefits provided by electronic ordering.

"I don't think we realized the full impact of this when we made the decision to adopt this system," he asserted.

Fast Orders

With the old mark-sense card system, it took 48 hours to get an order delivered. Now, Borneman said, nearly all of Ralphs stores receive their grocery orders within 24 hours, and for many stores, the elapsed time for grocery orders is little more than 12 hours.

At the same time, electronic ordering with the equipment eliminates any doubt whether merchandise pre-

viously ordered is enroute or is already on the shelf when the clerk records a new grocery order.

The old system was susceptible to error because a clerk writing an order would assume that the order he sent in yesterday was "in the pipeline" and would base the new order on what he saw on the shelf plus what was supposed to be enroute. But if the clerk had ordered, say, two cases of peas yesterday and only one was shipped, there might not be any peas left on the shelf by tomorrow.

Now, with electronic ordering, "before the store orders again, most of the merchandise from the previous order is on the shelf," Borneman said.

"When the clerk writes his new order, (Continued on Page S/22)

How to jump into key-to-disk, without giving up your

options

Granted, key-to-disk equipment does good things for data preparation in high-volume applications.

However,

This is one big jump that is best accompanied by a little foot-dragging. Because, in your enthusiasm for the things key-to-disk can do, you may forget what it can't do: read and punch cards.

And the punched card is still very much alive. Particularly as a turn-around document. But the useful unit record is also a pain in the processor for most key-to-disk systems. Leaving you with an awkward I/O problem, and possibly some dissatisfied using departments, too.

But what can you do? Hire, and train, two staffs

of operators? One for key-punch, the other for key-to-disk? Double up on equipment? Establish two different work-flows?

Don't.

Instead, call us. Ask to see one of our key-to-disk-compatible interpreting data recorders. It works *with* your key-to-disk system to give you multi-media capability. You can use it for I/O. Or flip a switch and slip into off-line keypunch mode. Each unit combines key-punch, verify, interpret and reproduce functions so you can have a lot of scheduling flexibility without getting a lot of machines.

The best of both worlds? Why not?

Decision Data Computer Corporation
100 Witmer Road
Horsham, Pa. 19044
215-674-3300

☐ Send me more information on your key-to-disk-compatible data recorders.

☐ Have your representative call for an appointment.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

We ☐ own a key-to-disk system made by:
☐ are considering a key-to-disk system made by:

☐ CMC ☐ Entrex ☐ Inforex
☐ Consolidated Computer ☐ Four-Phase ☐ Mohawk
☐ Data 100 ☐ GTE/IS ☐ Univac
☐ Other _____

On-line
key entry
for
CICS users!

See page 8 in the Special
Report section for details.

 **DECISION DATA**®
COMPUTER CORPORATION
makes computing cost less

The \$895 Dumb Terminal.™



To make a terminal less expensive, you'd have to make it cheaper.

We've sold more than 30,000 Dumb Terminals around the world.

But none of them left our factory before they passed some pretty tough tests.

Each completed terminal must survive a minimum of 168 hours of burn-in and seven separate test cycles. We test power supplies, monitors, keyboards, and logic boards. Then we run

another test on the complete assembly. Tests include functional, diagnostic, and debugging routines.

Only after a terminal passes all of these tests does it earn the name Lear Siegler.

So if you still want to buy a cheaper terminal than the Dumb Terminal, go right ahead. You'll get exactly what you pay for.

**DUMB TERMINAL.
SMART BUY.**



LEAR SIEGLER, INC.
ELECTRONIC INSTRUMENTATION DIVISION
DATA PRODUCTS

Lear Siegler, Inc./E.I.D., Data Products, 714 Brookhurst Street, Anaheim, CA 92803; (800) 854-3805. In California (714) 774-1010.

Enhances Two-Way Communications Firestone Breaks POS Data Collection Bottleneck

Special to CW

AKRON, Ohio — The Firestone Tire & Rubber Co. here is well on the way to unstopping a bottleneck in an otherwise sophisticated method of collecting and processing sales data from its domestic company-owned stores.

This should result in a substantial cost savings for collecting data in addition to speeding up processing and enhancing two-way communications between the main computer center and company stores, a spokesman said.

The company began installing NCR Corp. 250 point-of-sale (POS) terminals in its retail stores in November 1976. In addition to handling cash transactions, the terminals collect sales and unit information which is transmitted daily to a large scale computer center.

Prior to this, information was generated when store sales personnel wrote transaction tickets. Copies of tickets were mailed to the data center, where the information was processed with an optical character reading scanner.

The lag time as high as a week and the method was subject to human errors, such as transposed information. Furthermore, a high percentage of the documents had to be reprocessed by hand when after-the-fact errors were detected.

The rejects went as high as 30,000 per day and created additional lag time before information could be processed.

Self-Checking Numerals

Under the new method, sales are rung up on the POS terminals where most of the errors are caught immediately. Self-checking numerals are built into product codes and account numbers. The terminal performs a simple mathematical check to determine if the input is entered correctly.

The computing ability of the terminal also allows automatic extension of the sales ticket and calculation of sales tax, both problems in the past.

Today, stores on the system no longer have to mail documents each day because each evening an NCR 725 minicomputer polls each location. The 725 has been programmed with opening and closing times of the stores and will continue polling until terminated at a specified time by operational personnel.

This means the minicomputer usually has the day's data collected by sometime between 12 p.m. and 1 a.m. The data is processed for various sales reports issued for headquarters and 30 district offices the next day.

Firestone began converting its stores a few districts at a time and plans a complete changeover by July of this year. Until then, its sales data is a mix of next day information from the terminals and data three to five days old that is collected through the console-to-computer buffer scanner method. For those stores reporting through the terminals, the error margin is a fraction of 1%.

One of the advantages of the POS terminals is that they help the stores detect errors at the point of origin instead of after the fact. Also the store managers can check daily activity at any time and should no longer have to spend as much time on the phone reporting to district offices.

Increased efficiency is expected in the handling of Firestone's million-plus revolving charge accounts at the retail level since the terminals will help eliminate entry of incorrect customer information and provide faster turnaround of data results and accounts receivable posting. When documents were mailed, charges made near the end of the billing cycle often missed the current month's billing. This added 30 days before a payment was due from the account.

Another savings is expected to come from inventory reduction because the faster turnaround of information should make it possible for Firestone's stores to participate in a realistic re-

plenishment system.

Communications can be a two-way street, the Firestone spokesman noted. The firm is investigating equipping stores with a hard-copy printer so intracompany correspondence can be sent quickly to all offices. This will be resolved at a future date as to practicality.

Other uses, such as transmitting payroll information and automatic check transfer of store funds, are in the test stage, using information submitted on the terminals.

A key factor in the smooth conversion is a well-coordinated plan involving NCR, the terminal supplier and Firestone personnel, according to the

spokesman.

District management personnel receive a double dose of training. If district management can be brought in on the implementation of the system on an intimate level, their enthusiasm can spread to the store level and help them understand the system, he noted.

As each district is converted, managers from the next district on the schedule are brought into the training sessions. NCR 250s are provided for an intensive two-day training session.

Managers are given about a day and a half of theory and a half-day of intensive skill building on the terminals using a store model developed for this program.

Who?
What?
When?
Where?
Why?



That's what data collection is all about.

EPIC DATA offers you a simple, practical, flexible family of data collection products which can economically provide you with the information you need to answer these questions. Information which allows you to create reports on inventory status, job costing, production control, payroll, maintenance scheduling, access control, equipment circulation, time and attendance, goods consignment and circulation control so that management can make better decisions to reduce costs. And thereby increase profit.

WHO All data collected by the system can be pre-prepared. Or, where required, you may input variable data. By simply inserting his identification badge, punched or magnetic stripe, or reading the card's bar code, your employee tells the computer who he is.

WHAT Job cards, bar codes or key depression — all assigned by management — tell the computer exactly what he's doing.

WHEN An internal clock records when he started and when he finished.

WHERE The location of the terminal or variable key input tells the computer where he's working while travelling cards, bar codes or key depressions on the terminal input the amount of inventory being worked on or used.

WHY This collected data may then be prepared into reports telling you who worked on what, when, where, how many, and, often why or why not this operation was profitable.

CALL US TODAY. An Epic Data representative is ready to discuss how our simple, practical, flexible data collection systems can improve your profits.



epic data

In U.S.A.: 6350 LBJ Freeway/Dallas, TX 75240
Phone (214) 387-3121/TWX 910-860-5676

International: 7280 River Road, Richmond, B.C. Canada
Phone (604) 273-9146/Telex 04-355701

U.S. Sales Offices: 6350 LBJ Freeway, Suite 282, Dallas, TX 75240, (214) 387-3121 • 17 Amfer Court, Bayshore, NY 11706, (516) 666-0797 • 3415 Hickory Trail, Downers Grove, IL 60515, (312) 968-8620 • 1724 South Heather Hill Rd., Hacienda Heights, CA 91745, (213) 965-2886
Representatives: ARIZONA BFA Corporation (602) 994-5400 • CALIFORNIA Moxon Electronics (714) 635-7600 • FLORIDA COL-INS-CO (305) 423-7615 • ILLINOIS Systems Marketing Corp. (312) 593-6220 • KANSAS/MISSOURI Digital Systems Sales (816) 765-3337 • MASSACHUSETTS J & J Associates (617) 729-5770 • MICHIGAN/OHIO WKM Associates, Inc. (313) 588-2300, (216) 267-0445 • NEW YORK Cane Technical Sales (914) 698-4411 • NEW YORK Ossmann Instruments (315) 437-6666 • PENNSYLVANIA WKM Associates (412) 892-2953 • TEXAS DMA (713) 780-2511 • WASHINGTON DPM Associates (206) 453-9082 • UNITED KINGDOM Sintrom Ellinor Ltd. Reading (0734) 85464

Persian Language Scanned Using Number Code

(Continued from Page 5/2)

accident statistics because traffic is by far this country's single biggest problem. Another reason for tackling this first was because it is one of the very few reporting systems where information is collected on a prestructured, preprinted and prenumbered form.

This form is the traffic accident report, not unlike accident report forms found in the U.S., except, of course, that it is printed in Farsi and the information recorded on it is in Farsi.

Fortunately, Farsi numerals have a one-to-one correspondence to our own Arabic/Numerals (although written considerably different) and do read left to right in spite of the fact that all Farsi reads right to left. Therefore the best way to attack the data collection and

processing problems in Iran is to "do it by the numbers."

Using numerics as a common denominator between the two languages, we designed a completely numeric record and then developed translation tables, first in English and then in Farsi, that would translate the codes on output reports to the respective language.

Time Factor

Everything to date has been done to produce English output reading left to right and then converted to produce Farsi output reading right to left. Our experience so far has revealed that it takes almost an equal amount of time to convert a program that has been written, compiled and checked out successfully to produce English output

as it does to produce the same output in Farsi that reads from right to left.

Developing and implementing a system that collects, processes and outputs data in a foreign language such as Farsi for an application such as traffic accident statistics might be considered relatively easy when numerical codes can be readily assigned for answers to such questions as where the accident took place, what was the cause, what were the weather and road conditions, what types of cars were involved, who were the casualties, what was their sex and age and what was the type of accident.

Each of these questions can be equated to a single numeric code of 0 to 9 (with the exception of location, which may require from two to four

digits). Of course, such numeric information as report number, date, day of week and time of day present no problem at all.

More serious problems are bound to arise when we move on to other applications where it will be virtually impossible to confine the record to numerics only. A criminal history record of an arrested smuggler, for instance, is going to require the accommodation of alphabetic information in the Farsi language.

Data Collection

At present the only means we have to collect Farsi data is by way of a key-punch with a Farsi character set keyboard. The keypunch, unlike Farsi typewriters, does not have a right to left carriage. Column 1 of the key punch card is the left most and not the right most column. This means that to collect Farsi data, it must be read backward because there is no other way to punch it, and Farsi CRT terminals right now are still in the test and checkout stages.

The problem can be alleviated by having the keypunch operator read the Farsi from right to left as is the custom but punch from left to right (as there is no other choice). Before the data can be processed, however, programs to store it on tape or disk must transpose each character in a field (e.g., a name field of 20 positions, column 1 becomes column 20, column 2 becomes column 19).

To add to this dilemma, consider the fact that a standard Farsi typewriter has a selection of 90 alpha, numeric and special characters while the keypunch has only 64 characters.

At present we are confined to using Honeywell Information Systems, Inc. 6000 series hardware that provides for no more than a 64-character set, accommodated by its 6-bit internal machine code. Therefore, in attempting to duplicate the 90-character selection of alpha, numeric and special characters available on the Farsi typewriter with a character set that numbers only 64 is not easy — something had to give.

In order to accommodate the 32-character Farsi alphabet, as well as those characters of the Farsi alphabet that change form depending on their placement in the word, all punctuation characters with the exception of the period, dash, slash and asterisk were sacrificed. In other cases, two characters were required to form a single Farsi character and certain, less significant Farsi characters were deleted altogether from the 64-character Farsi set.

This all, of course, leaves computer output in Farsi far short of what the standard Farsi typewriter is able to produce.

Also, considering the fact that a page of English text translated to Farsi may not require any more than a single page, the fact remains that one can not estimate data element field size based on English and expect that same estimate to hold true for Farsi.

The rule of thumb generally is to estimate in English, then add half again more for the Farsi translation. This, of course, makes for longer records and increased storage requirements, much of which may be unnecessary — but there's no other choice.

So if you think you have data collection problems, how would you like to trade places with us?

CICS Users:

You've just written your last on-line data entry program.

KEY/MASTER is the CICS application development system you've been waiting for. With KEY/MASTER data entry applications are designed and tested right at the terminal. There's no coding, no compiling, and no delay.

Easy to use.

All you specify is the format of the data to be entered and the editing rules. KEY/MASTER does the rest. All the logic needed to accept data, edit it, and store it in KEY/MASTER's own on-line database is built in.

If you've wanted to bring your key-entry facilities on-line, now is the time.

KEY/MASTER's features are superior to all known key-entry systems (whether keypunch, key-to-tape, or key-to-disk) and require no user programming.

Ready in minutes.

KEY/MASTER can be installed and ready for use in minutes. It works with both CICS and CICS/VS and runs under any operating system. All you need is 32K of virtual or real storage and one or more local or remote 3270 (or compatible) terminals.

No risk!

KEY/MASTER can be leased for \$295 per month or purchased for \$12,000. Each system comes with a 30-day no-risk guarantee. After 30 days, if you're not convinced that KEY/MASTER is the ideal system for developing on-line data entry applications, simply return the system for a full refund.

We'll be glad to tell you more, give you a demo, or sign you up for a 30-day trial. Just clip the coupon or call.



turnkey systems inc.
111 east avenue
norwalk, connecticut 06851
(203) 853-2884/telex 964351

839 mitten road
burlingame, california 94010
(415) 697-1833

tsi international, ltd.
19 bedford row
london WC1R 4EB, england
01-405-7304/telex 23302

additional
representation
worldwide



- ☐ We're interested. Send a brochure.
- ☐ We'd like a demo.
- ☐ Schedule us for a 30-day trial.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____



Data communications made simple. The DECwriters.

Simplicity is part of what makes the DECwriters the world's most popular 30 CPS teleprinters.

And we took the same simple approach to our communication options:

Our unique modem/DAA includes a phone plug which lets you connect the terminal to any modular phone jack. And since both modem and DAA are tucked neatly inside the terminal, there's nothing extra to lug along.

Our integral acoustic coupler uses a single electrical connection — no EIA interface needed. Everything is in one compact package, and it fits right on the back of the terminal.

Our electronic send/receive buffer (ESR) is a neat, convenient alternative to magnetic and paper tape. It's simple to use, which saves operator time. And its quick editing capability minimizes phone line charges. In fact, the

ESR will normally pay for itself within four months.

Naturally, the options you need depend on the applications you have in mind. But one thing's for sure — you won't find any simpler solutions than ours.

For details, call 800-225-9220 (in Mass., 617-481-7400), or write Digital Equipment Corporation, MR2-2 M70, Marlborough, MA 01752.

digital
COMPONENTS
GROUP

Bowlers Spared Paperwork With Diskettes

By Tim Scannell
CW Staff

MILWAUKEE — Bowling is a sport requiring little more than a set of pins, a ball and a flat surface. The American Bowling Congress (ABC), however, in conjunction with the Women's International Bowling Congress (WIBC), has taken the sport a step further by using a data entry system to assist in handling the voluminous paperwork associated with bowling leagues and organized team activities.

The Local Bowling Association System (LBAS), implemented more than two years ago, is geared to the larger bowling association or group of smaller associations which use the individual membership processing plan, an ABC spokesman said. Specifically, the system is used to process membership cards, team rosters, accounting transmittals, sanction certificates and mailing labels.

It is also used, to a lesser degree, for keeping track of dues collection and an individual bowler's scoring record, the spokesman related.

System Configuration

The data entry configuration used by the ABC is an IBM 3741 attached to an IBM 3715 printer. Since adopting the system, the various associations around the country have succeeded in reducing the amount of clerical work, established reference files that are easily accessible and reusable year to year and have lowered the cost of yearbook preparation by producing camera ready copy instead of requiring typesetting, the spokesman explained.

The idea was originally proposed by IBM and it designed the basic system, according to William Burke, DP manager at ABC. "The individual associations pay for the machine themselves although, we have the programs all developed and help them get started," Burke noted.

Hesitation Over Cost

Although the computerized system has been readily accepted by the major bowling associations, the smaller organizations are hesitant because of the cost involved, Burke stated.

"They have to be well satisfied that it's an economically justifiable move," Burke explained. "They have to vote on it themselves and adopt it voluntarily — we can't force it on them."

Any association with more than 20,000 members could justify such an expense, Burke pointed out, and the "system is so designed that smaller associations can group together and use the same machine."

Because the 3741 is a data

entry machine, it can't do any actual "computing." At the end of a season, when preparing the yearbook, the entire diskette is either sent to a local service bureau or to ABC headquarters "where a computer is used and members are alphabetized and listed out... with their averages in the various leagues," Burke said.

In compiling their annual reports, it was discovered that

60% to 70% of the bowlers' averages are the same from one year to another. Working on the basis of this stability factor, IBM redesigned the system and added a second disk drive to the 3741.

Time and Money Saved

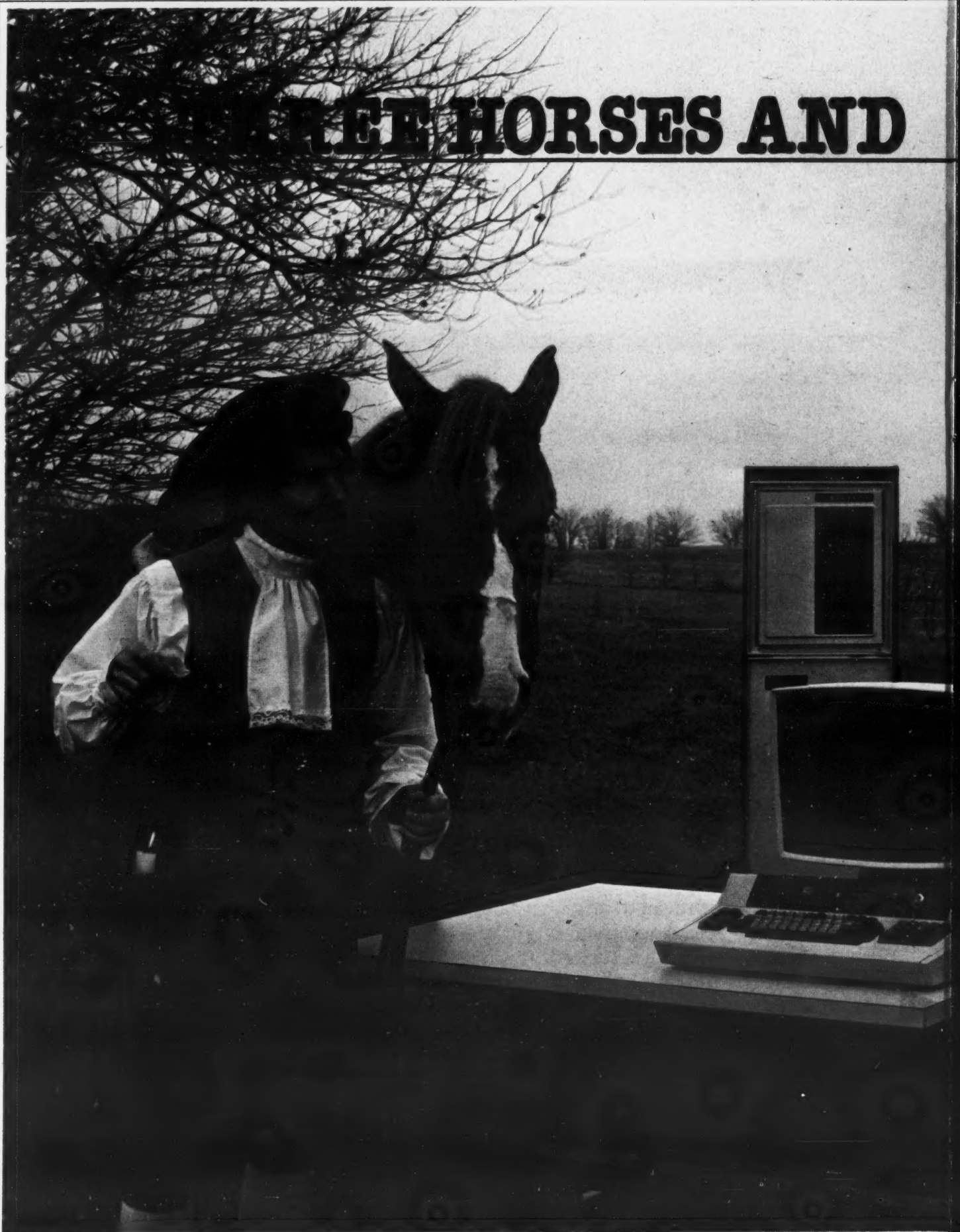
Programs were then written, that allow the associations to "copy from the previous year's records," thereby saving time and money, Burke said.

"I guess you'd call it operating from a very kindergarten-type data base... but it's really functioning quite well," he remarked.

The LBAS, described as a "grass-roots type" of computerized recordkeeping, is currently being employed by the bowling associations in such cities as St. Louis; Denver; Albany, Syracuse and Buffalo, N.Y.; and Anaheim and San Diego, Calif., Burke said. Al-

though the system is fairly new, the ABC is already looking for ways of developing it to parallel the growth of bowling in the future.

"The bowling community is expanding and I suppose in the future we can put an adapter on the 3741 and hook it up in an on-line type of thing," Burke commented. "At this point, however, there is no real need to convert to an on-line network."



Ends Administrative Overtime

Yale Saves Annual \$25,000 With Key-to-Disk

NEW HAVEN, Conn. — Because of the control and flexibility its present system offers, Yale University's Administrative Data Systems (ADS) claims to save more than \$25,000 a year in outside service bureau and in-house overtime charges for data entry.

Reid Kaplan, manager of user services for ADS, directs the data entry operation and is

part of the management team responsible for "practically the only computer on campus that isn't devoted to scholarly work."

ADS' activities are as varied as the university itself, Kaplan explained, and include applications ranging from general ledger accounting to costing-out recipes, keeping track of admissions, maintaining an

alumni file and monitoring a \$500 million endowment fund, the third largest of any U.S. university.

To help manage the more than 130 competing activities in an orderly manner, the nearly 300-year old Ivy League college uses dual Data 100 Corp. Model 74 keybatch systems. An IBM Corp. 360/67 is used to process the

data.

Before Yale installed the 16-keystation, 10-million-character key-to disk keybatch system in 1974, it used keypunch machines to put data into computer-readable form. Because of ADS' extraordinary data entry requirements, the overload was performed by an outside service bureau (\$1,100/mo cost

differential) and handled in-house on an overtime basis at a cost of \$15,000/year.

Besides the physical limitations of the keypunches to handle the increasingly large volumes of data, ADS had no way to determine where the data was coming from or when it would come. "A university is not as simple as a manufacturing operation," Kaplan said. "We get money from a lot of sources that has to go a lot of places. What we needed," he noted, "was a machine that would allow us to have scientific management of our resources."

"With the Keybatch system, we not only got a system that could accommodate heavy loads," Kaplan said, "but one that would allow us to control the data instead of the data controlling us."

Operator Statistics

One of the system's most unique control mechanisms, Kaplan has discovered, is its operator statistics feature. Using this input/output batch control capability, Kaplan gets daily reports detailing the progress of each project by name, by forms type and by operator.

"We know, for instance," he noted, "that we usually do an average of 18 million keystrokes a month and that accounts payable, general accounting and the Office of Professional Services (an outpatient billing organization at the Medical School) will account for the greatest volume of work."

"We also know that The Campaign for Yale fundraising projects will occasionally swell the monthly keystroke rate to 24 million and that December through March will bring a flood of admissions work. Therefore, we can staff ourselves accordingly."

Weekly reports generated by the system are geared towards operator productivity. These reports pinpoint activities such as keystrokes, accuracy and entry and verify error rates that help Kaplan gauge the individual performance of his 18 operators.

On the average, error rates stay well under .3% with indi-

(Continued on Page 5/19)

A GOOD NIGHT'S SLEEP.

That's what Cummins Distributed Processing Systems would have saved me that dark, brisk night in April, 1775. With the Cummins technology that's available to you today, independence would have been achieved much sooner. That's for certain.

Cummins Key/disk and KeyScan® Multimedia Systems are designed to meet the needs of business management. Whether in a centralized or distributed environment, these systems can be configured to meet your data processing requirements in the most efficient, cost effective manner.

In my day, we'd have had a Series 5400 as our host system in Boston, Series 4400 Systems in all major colonial centers and Series 2400 Systems or remote terminals in outlying towns and villages.

Keep in mind that Cummins Systems can be configured with MICR, OCR, punch card and OMR reader-sorters as well as CRT/keystations. No other systems offer such data entry flexibility. So as your needs change, your Cummins System can be upgraded simply and economically.

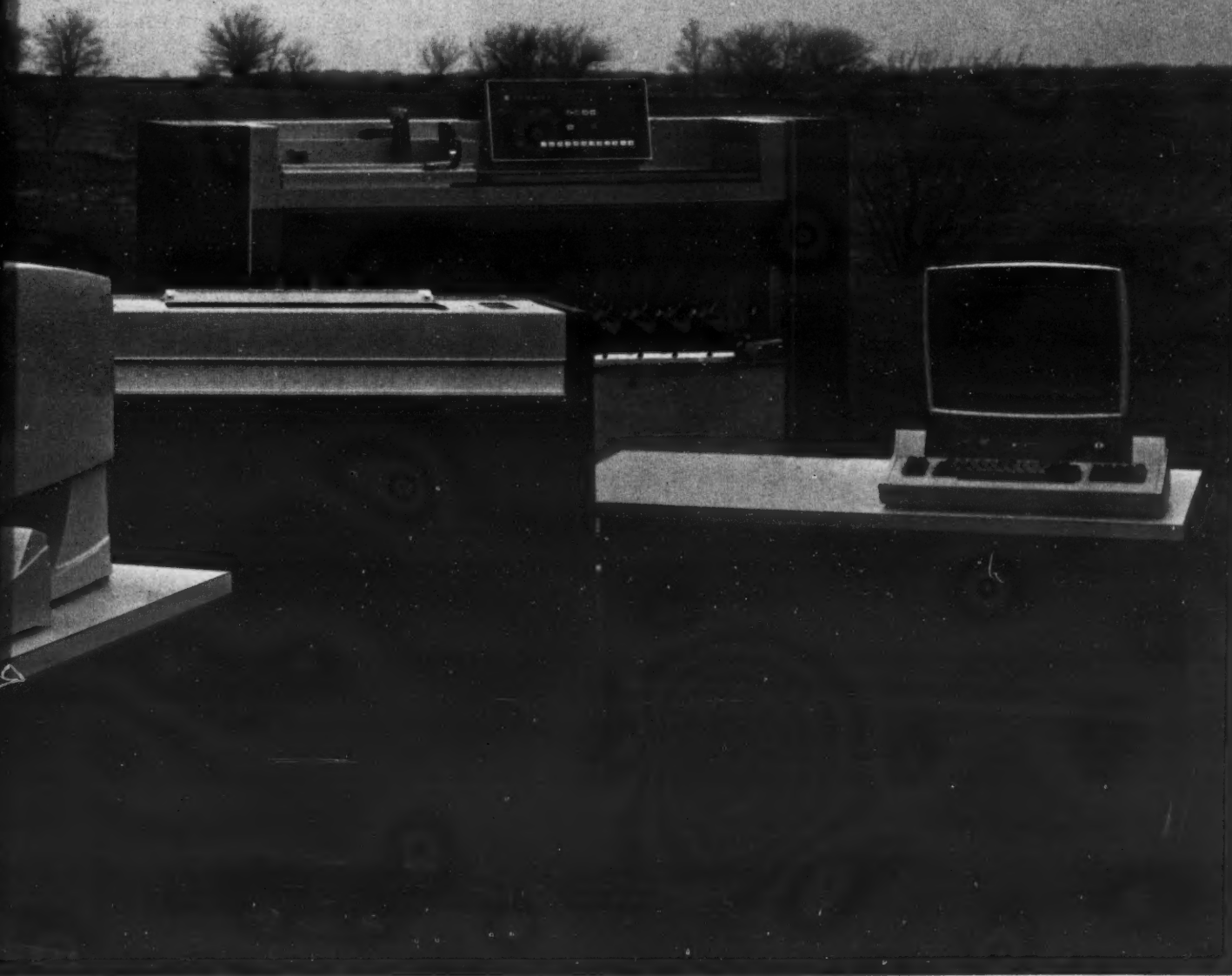
State-of-the-art hardware.

Comprehensive, easy to use software. Communications. Reliable, user-oriented data processing power. So don't wait 203 years to realize what you might have done for your company. Take a close look at the Cummins family of distributed processing systems. Do it today and make history with Cummins.

Write our Corporate Headquarters for more information.

CUMMINS
CUMMINS-ALLISON CORP.

Data Systems Division
800 Waukegan Road
Glenview, IL 60025-312/724-8000



BLIS/COBOL
MULTIUSER OPERATING SYSTEM

makes your DG
NOVA/ECLIPSE
BLISsful

For information call today...

IPI
SOFTWARE
Phone (305) 647-2200 USA
TWX/Telex 810-853-5033
1850 Lee Rd., Winter Park
(Orlando, Florida 32789)

Personnel Emphasized in European Data Entry

(Continued from Page S/3)

widths and values.

The second technique involves rather more operator skill, but yields considerably greater operator efficiency in terms of the rate of input of data sets. This is the use of the so-called "short-hand dialogue," which involves the keying of a small number of characters.

These are expanded by the system into a considerably greater number of characters that return to the operator for visual verification. For example, the entry of the telephone number or Zip Code into a system can produce a response consisting of the complete name and address of the organization or individual concerned, after which succeeding dialogue can define the ac-

tion to be taken.

The third method involves the selection of one item from many, using the so-called "menu selection" technique. Menu items are sometimes selected by depressing a single key or sometimes by using a light-sensitive pen (it is important to distinguish between light-sensitive pens that detect the illumination of part of a display screen and light-transmitting pens often associated with mobile optical mark readers).

Menu selection techniques are particularly powerful; if the operation of selecting one item from 10 is repeated six times, then the operator or user can rapidly "home in" to one item selected out of a million. This technique is therefore particularly suitable for

selection-type applications in which one item must be chosen from several. All of the items required or available can be stored within the computer system prior to selection.

Large backing storage devices recently associated with today's mini-computers and intelligent terminals are opening up a considerable number of possibilities in this area.

Over here, some of the special-purpose data entry techniques very familiar in the U.S. have not been used quite so widely. In European terms, the basic technology required to read character patterns is still expensive.

Its application here has probably been restricted by virtue of the fact that it has been rendered obsolete for the input of day-to-day data by the di-

rect data entry techniques described above.

However, OCR is of interest in one or two specialized cases. For example, one large UK company, faced with the problem of transferring its personnel records to a computer-based system, successfully read the typewritten forms previously used within the manual system using OCR techniques.

It should be noted that this was a one-time job and an OCR service bureau was used. Very few companies here find the installation of OCR equipment is justified, especially multifont equipment. While OCR can be useful at the time of system "take-on," it is rarely useful for ongoing data input.

A number of novel devices are emerging over here, that provide particular capabilities. An interesting UK device is the Datapad from Quest Automation, which recognizes handwritten information. Another interesting development in this area automates the handling of traditional documents and "paces" the operator through the fields on a form using an array of LEDs. It is claimed that key depression rates of 27,000 to 31,000 key depressions per hour can be achieved by skilled operators.

Intelligent Equipment

The provision of "intelligence," or processing power, and in some cases storage, within the user environment for data entry purposes has led to another trend — the migration of the processing of certain low-level user tasks into the intelligent equipment in the user environment.

Today, intelligent equipment often does a combination of data entry activities and minor user tasks such as the preparation of invoices, order copies and picking lists and dispatch notes. This is very much in line with a major trend toward the use of distributed systems that divide user task processing between the user location and a remote location.

Distributed systems are opening up many interesting and exciting possibilities in terms of expanding the application of computer-based systems and improving the cost-effectiveness of many of today's information/processing systems.

A final major factor that will almost certainly become important here in the future relates to the costs associated with data entry relative to those of data storage and data communications.

In summary, data retention will probably increase in importance as it will reduce the need for general-purpose data entry involving keying, which is likely to become more and more expensive as staff costs rise. This may well be Europe's alternative to the specialized data entry methods that have gained favor in the U.S. It appears we may make a direct transition from today's general-purpose data entry methods such as direct data entry to wired data methods and the retention and communication of data within systems that will progressively reduce personnel requirements and improve system performance.

Here, standards for open systems interconnection are vital.

Taylor is a telecommunications specialist with the UK's National Computing Centre.


MODEL 70 CRT VISUAL DISPLAY TERMINAL

TO THE SUPPLIER OF BUSINESS SYSTEMS WHO HAS MORE IMPORTANT THINGS TO DO THAN BUILDING HIS OWN CRT VISUAL DISPLAY TERMINALS.

- AESTHETICALLY PLEASING 21ST CENTURY DESIGN
- STATE-OF-THE-ART MICRO-PROCESSOR DESIGN
- DETACHABLE KEYBOARD
- IMMEDIATE SHIPMENT FROM STOCK
- EXTREMELY SMALL SIZE
- MOST EXTENSIVE TESTING AND BURN IN IN THE INDUSTRY
- MTBF CALCULATED AT 6400 HOURS PER MIL-HDBK-217B
- CAN BE TAILORED TO YOUR REQUIREMENTS
- MODULAR DESIGN FOR MINIMUM DOWN TIME


TEC, Incorporated
 2727 N. Fairview Avenue
 Tucson, Arizona USA 85705

I'm interested in the Model 70.
☐ Please send literature ☐ Call me ☐ Arrange demonstration

Name _____
 Title _____
 Company _____
 Address _____
 City _____ State _____
 Phone _____

...FROM THE PEOPLE WHO HAVE DESIGNED, BUILT, AND SOLD CRT'S SINCE 1966 AND CAN'T THINK OF ANYTHING MORE IMPORTANT TO DO.

TEC, Incorporated 2727 N. FAIRVIEW AVENUE, TUCSON, ARIZONA USA 85705 ■ (602) 792-2230 ■ TWX 910-952-1377

AN EQUAL OPPORTUNITY EMPLOYER M/F, COMMITTED TO AFFIRMATIVE ACTION - A TEC, INCORPORATED CORPORATE POLICY

Unit Pays for Itself Scanner Helps School District in Bus Purchase

Special to CW

MESA, Ariz. — A school district here is using data obtained through optical mark reading to help guide the school board in making school bus purchases. In addition, the scanner performs such glamourless tasks as recording class attendance, scoring tests and obtaining student data for guidance counselors.

The system also raises about \$15,000 a year by doing work for other school districts.

Built by National Computer Systems, Inc. of Minneapolis, the Sentry scanner reads two million scan forms a year, abstracting key information and feeding it to a computer. The computer either stores the information or outputs it on a high-speed printer for immediate use.

The scanner's tasks are limited only by the district's needs and DP Director Tom Rowe's imagination. Take the school bus study, for example. Drivers fill out scan forms showing mileage, gasoline and oil used, repairs and costs.

By comparing records, the district can figure out the best time to trade in old buses or budget ahead for anticipated repairs.

The district can also determine which school bus manufacturer's product has the best service records, taking that into account when making new purchases.

Potential Dropouts Identified

Another example is the district's program to quickly identify potential dropouts. Here Rowe uses the scanner to check grades, absences and behavior reports to pinpoint students on the verge of quitting school. Names are turned over to counselors and principals.

The scanner helps with other pupil problems. Teachers periodically fill out a special form focusing on behavior and emotional or physical problems such as stuttering, fighting or falling asleep in class. The scanner screens out these names and they are sent to school psychologists.

The bulk of the scanner's work is more prosaic, however — checking attendance, scoring tests, marking grades. Arizona law requires attendance reports from every class, so teachers fill out scan forms — 30,000 of them every week. Altogether the scanner handles more than a million of these attendance forms every year.

The next biggest workload is test re-

ports. The scanner scores 500,000 proficiency tests a year plus 100,000 teacher-made tests. The scanner can count the number of right and wrong answers, show which questions were missed and even print a letter grade.

Test results show pupils' progress; they also show the teacher where the class may be having particular difficulty with a lesson.

Once all the tests are scored, the scanner works on grade reports. The scanner/computer team prepares cards for each student and sends a class rank and honor-roll list to every school.

The scanner also helps prepare class schedules. Pupils fill out scan forms showing the classes they want for the

coming semester. These forms are read by the scanner, and the computer sets up times and places for each class.

The scanner also handles athletic prowess tests. Results are sent to each parent showing the child's physical fitness. Results are stored in the computer memory along with information on each student's academic progress.

Growing Return

Besides handling two million scan forms a year, the scanner is also earning money. In addition to the work for the Mesa schools, Rowe rents scanner time to schools in nearby Tempe, Glendale, Peoria and Chandler. Altogether this generates around \$15,000 in an-

nual revenue, helping offset the scanner's \$75,000 cost.

Rowe expects this return to grow. "After all," he said, "there's a lot more we can do. We predict maintenance for the bus fleet; no reason we can't predict maintenance for our schools' mechanical equipment as well."

"And we handle pupil records; we could also handle payroll records, mileage expenses and overtime costs."

"For us, those two million scan forms are just a start. We should double the amount in a few years, using the same scanning equipment."

"In fact, I see the time when the scanner will offset its costs each year," he said.

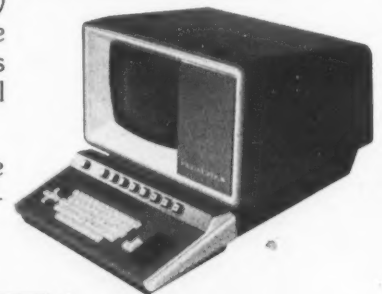
Do You Have A Language Barrier?



If communicating in Arabic, Farsi, German, Hebrew, Russian, or any other language presents an obstacle to your data processing, MEGADATA's 700/DL Dual Language Terminal will help to overcome this problem. This intelligent programmable terminal can display two completely different character sets simultaneously or separately, using the same bilingual keyboard, and it provides complete text writing capability for two different languages.

The software for the 700/DL is no problem either, because it is tailored specifically for your application. Furthermore, the entire software package can be adapted easily to your requirements, minimizing any change in the existing program. Hardware obsolescence is eliminated by simply updating the software capability. Interactive Data Entry, Complex Interrupt Capability, Forms Control, Format Storage, Validation—they are all available with the 700/DL.

For further information about the 700/DL or the many other application-oriented MEGADATA terminals, call or write TODAY.



MEGADATA
CORPORATION

35 Orville Drive • Bohemia, New York 11716
Tel. 516-589-6800 • Telex: 14-4659



Central Regional Office: 2200 E. Devon Avenue • Suite 217 • Des Plaines, Illinois 60018 • Tel. 312-296-1900
Western Regional Office: 15910 Ventura Boulevard • Suite 800 • Encino, California 91316 • Tel. 213-990-9777

**On-line
key entry
for
CICS users!**

See page 8 in the Special
Report section for details.

Features 'Operator-Designed' Keyboards Key-to-Disk Speeds Check Imprinter's Work

LAKEWOOD, Colo. — A large manufacturer of bank checks and other negotiable instruments here is using a key-to-disk system to speed up and improve its check imprinting operation.

The system, reportedly the first of its kind for a bank note printer, is already providing faster service for three reasons, according to Roland Thomas, DP manager for the Rocky Mountain Bank Note Co. (RMBN). First, he claimed the keyboards are arranged exactly to the operators' needs and are easily learned by new

personnel.

Second, the equipment automatically provides the basic coding instructions required for individual bank imprints — coding the operators previously had to enter themselves. Finally, the system provides a magnetic tape each evening containing all of the day's work, and this is put on microfiche for customer use.

The firm has 12 plants throughout the western U.S. that use the Mohawk Data Sciences Corp. (MDS) system to handle up to 11,000 imprinting orders daily.

The MDS 2409-2 includes a disk unit with a capacity of 90,000 records of 125 char. each, which allows high-volume production work. The firm is now using 11 of 12 planned MDS 2491 keystations. The full system will not only speed typesetting, but will also make possible other simplifications and savings when complete.

Typing of names and addresses, for example, will also be signalled to RMBN's accounting system. An MDS 2481 tape drive is used to keep the permanent records for the accounting and billing departments.

"Further," Thomas said, "the new MDS equipment will be

The text and all the coding information is displayed on the MDS 2400 CRT screen for easy sight verification. Corrections can easily be made at this point. Once the operator is satisfied that the correct message has been typed, it is ready for transfer to paper tape. There is follow-up proofing of the actual Linotype output, done on test sheets from a proofing press.

Although there are a number of additional steps after the typesetting and printing have been completed — collating, trimming, binding and mailing — RMBN can usually get imprinted checks into the mail within 24 hours after the order has arrived at its plant.

tional symbols and special keys for the tape information are located at positions on the end of the board. The key repositioning is easily accomplished by minor changes in the software systems that program the 2400 system, according to James Biltz, systems analyst.

With key to paper-tape equipment that is being phased out, the tape is produced right on the machine by the operator. With the MDS equipment there will be no paper tape in the keyboarding room so the firm expects less noise and dust.

Instead, taped information is recorded on the MDS 2478 disk drive. One such unit holds the input from all the keyboards — another advantage over the lower storage capacity of tapes.

At a convenient time, the data stored on disk is transferred to a high-speed paper-tape punch (MDS 2468) that perforates at a 150 letter/sec rate. The output of several operators can be prepared at once and taken to the Linotype machines for further printing.

The taped data is not retained beyond its single use. Experience shows that customers change banks and addresses so frequently that it is simpler to start from scratch each time an account requests a new batch of personal checks.

While advanced photo composition and the offset process will play an increased role in future production systems, Thomas said that traditional linecasting and letterpress techniques will continue to serve as the mainstay of the industry.

"In the meantime," Thomas said, "there is much to be (Continued on Page 5/19)



Squeezed by COSTS?



Chaffing over DELIVERIES?



Want MORE RELIABILITY?
EASIER MAINTENANCE?
and a
FULL YEAR WARRANTY?

DX00 SERIES SMART TERMINALS



EECO

1441 East Chestnut Avenue
Santa Ana, California 92701
Phone: (714) 835-6000



RMBN Data Entry Supervisor Helen Zajicek enters check orders.

ready for, and compatible with, new equipment that may replace the typesetters and presses employed in the actual imprinting."

Letterpress and Offset

Much of the equipment now used at check printing plants is a combination of old and new, Thomas explained. At the RMBN shop the actual imprinting is still primarily a letterpress operation — metal type, set by Linotype, is set in position and locked by hand in a standard form, which is then inked and pressed onto the blank check form. The check form is preprinted elsewhere in the plant on offset color printing presses.

The Linotypes were modified several years ago so they could be actuated by six-level paper tapes. The tapes include coded specifications for exact type face, size, spacing, margins and other details.

Although the modification is far faster than the old system of a Linotype operator adjusting the spacing while typing, it offers no easier way to proofread the text until the cast metal type is taken from the machine and run on a proofing press.

At RMBN, the keyboards are still being "operator designed" for maximum efficiency. Letter and coding keys are assigned to board positions that feel best to the majority of the operators.

Letter keys are presently in the same pattern found on electric typewriters, but addi-

VOLUME KEYPUNCH SERVICE

DATA MIDWEST
SERVES
BUSINESSES NATIONWIDE

QUALITY DATA
AT
COMPETITIVE PRICES

Keypunch • Keydisc • Typescan • OCR Processing



DATA MIDWEST
3050 METRO DRIVE
MINNEAPOLIS MN 55420

MINNESOTA'S LARGEST
DATA ENTRY SERVICE
612-854-1800

CRT Net Keeps Pace With Hospital's Growth

By Frank Barbee
Special to CW

LAKELAND, Fla. — A rapidly growing regional hospital usually has more problems than it needs, particularly when it comes to data processing and communications. Systems and procedures just never seem to keep pace.

Lakeland General Hospital, however, seems to have avoided many of the problems that could have arisen during the past few years as it developed an automated, integrated patient information system able to cover all of its departments.

When Lakeland began installing the system in 1973, it had about 520 beds. Since then, it has grown to 640 beds and has been certified for 900 beds.

During these five years of rapid growth, the hospital made very few changes in the basic system, and it has more than kept pace with its growth. It is on-line 24 hours a day to all departments — including the nursing floors, admitting, radiology, laboratories, pharmacy, dietary, medical records, emergency room and all other patient care activities.

For the past year, the hospital has been moving ahead into fully automated laboratory equipment so results can be transmitted directly to nursing stations as soon as they are known. Plans are also under way to install CRTs more than a half mile away in a medical group practice clinic so physicians can review lab results as soon as they are completed.

Lakeland has used a remote time-sharing computer service until 1973. The service was limited primarily to financial applications and had no real-time capabilities, and Lakeland saw it had little room to expand its communications and information processing capabilities to match its physical growth.

During a two-year study of future needs, conducted by the board of trustees and the administrative staff, the hospital set a number of specific objectives including:

- A "total" data processing capability.
- Improved patient care and services.
- More efficient use of equipment and facilities.
- Real-time transmission of all charges and requisitions.
- Reduction in lost charges.
- Patient billing, with pro-rated insurance, on demand.
- Cost containment and improved cash flow.
- Capacity to handle all new requirements as the hospital expanded.

The system Lakeland installed to meet those challenges was developed by National Data Communications, Inc. (NDC) of Dallas. It is a massive software data base encompassing more than 9,000 individual, but integrated, programs. Most are on-line, real-time applications, with some batch processing for the fiscal areas.

CRTs and Remote Printers

Basic to the system, which was tailored to the hospital's specific need by NDC, are the CRTs and remote printers the company designed for the hospital. Lakeland can install as many CRTs and remote printers as needed throughout the facility, giving all departments, wherever located, immediate real-time access to the data base.

The CRT has an information display

screen bordered on the left with 20 "select" buttons. A full input keyboard is in front. Most tasks are initiated by pressing the select buttons, and the keyboard is used to enter such variable data as a patient's admitting information or narrative reports.

Individually coded badges are needed to access to the system. The Badges

identify the individual and describe what categories of work he can do. The system lists those categories on the screen and permits the individual to do only those functions he is authorized to perform.

Upon entry of information into a terminal — for example, a doctor's order — the system automatically transmits

the information to the departments that have a "need to know," and all patient billing information is generated and immediately posted to the patient's files and the general ledger. Hard-copy printouts are produced whenever they are needed when information is fed into the system, and the CRT screens
(Continued on Page S/29)

Install the new SERIES 2 KEY-EDIT® distributed data entry system today, and take care of tomorrow, too.

NEW 1920 CHARACTER DISPLAY TERMINALS
FROM 24,000,000 TO ALMOST ONE BILLION
BYTES OF DISK STORAGE . . . PERFORMS
DATA ENQUIRY, ENTRY, UPDATING, EDITING,
PRINTING, COMMUNICATIONS AND MORE
ALL SIMULTANEOUSLY!



SERIES 2 — KEY-EDIT 2000

The low-cost alternative to key-punch, key-to-tape and first generation key-to-disk equipment.

As a starter data entry system, you can't do better than a new KEY-EDIT 2000. You get all the advantages of the proven KEY-EDIT concept and software compatibility, but at lower costs than you might expect. Once you move into the shared-processor environment, future potential growth in sophisticated editing and control techniques is assured.



SERIES 2 — KEY-EDIT 2022

Replace remote batch and communications terminals with a multi-tasking stand-alone KEY-EDIT system.

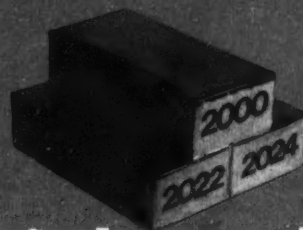
For high-performance communications in a data entry environment, you can't ask too much of the KEY-EDIT 2022. It combines the full capabilities of a high-speed remote batch terminal with a powerful multi-tasking key-entry stand alone processing system. You can do more with a KEY-EDIT 2022 because you get more!



SERIES 2 — KEY-EDIT 2024

The powerful distributed data entry system.

System 2024 is a distributed data entry system that does it all, including transaction-oriented data collection at local or remote user operating departments. Unique file management techniques enable the user to enquire, enter, update and examine data in real-time without affecting the main central computer.



We built it that way!

Get the complete story on the new SERIES 2 KEY-EDIT family, and what it can do for you. Call Manager, Product Marketing (416) 449-1120. Or write today.

We know you can rely on your KEY-EDIT SERIES 2 system today — and tomorrow, too. Because we built it that way!



CONSOLIDATED COMPUTER INTERNATIONAL INC.

275 Wyman Street
Waltham, Mass. 02154

Consolidated Computer has already installed over 20,000 KEY-EDIT terminals.

® Registered trademark of Consolidated Computer, Inc.

Take care of today, tomorrow . . . and beyond with KEY-EDIT Series 2

Yes, I want more information on:

- ☐ Data Entry — KEY-EDIT 2000
- ☐ Data Communications — KEY-EDIT 2022
- ☐ File Management — KEY-EDIT 2024
- ☐ Please send me a FREE copy of "People Side of Data Entry"

Number of terminals installed _____

Name _____ Title _____

Company _____

Address _____ Phone () _____

City _____ State _____ Zip _____



CONSOLIDATED COMPUTER INTERNATIONAL INC.

275 Wyman Street, Waltham, MA 02154

Standardized Form a Plus

Data Entry Net Eases Air Force Acquisitions

By James R. Harbin

Special to CW

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The Air Force Systems Command (AFSC) uses "source data automation" as the major input method for its Acquisition Management Information System (Amis). The system is being developed by the Amis program office here.

Within AFSC, the input method is defined as capturing data at its source in a format for processing on the computer.

Three Reasons

Source data automation was chosen for Amis for three reasons. First, it reduces the manual abstracting effort and saves manpower. Second, it

results in more accurate contract documents because it permits validation and error correction prior to the distribution of contractual instruments. And finally, the technique allows timely entry of information into the data base.

There are many varieties of data entry and many ways to use its capabilities. Optical character readers, CRTs and

communicating magnetic card typewriters were tested in light of contracting requirements.

The typewriters were chosen for several reasons. They provided the ability to simultaneously capture data and prepare hard copy. This was extremely important since hard copy could not be eliminated.

The magnetic cards also pro-

vided excellent document correction capabilities when errors were detected because a page-to-card relationship could be maintained.

This capability, coupled with a systems designed with a page-to-page validation correspondence, provides for easy correction of errors on each page and for the filing of cards with the represented page.

In addition, the magnetic card typewriters posed no additional administrative workload, or overhead, in the form of posting to sheets, abstracting or changing machines to duplicate the hard copy. They were multipurpose in that they could also be used for the administrative office work and electronic mail.

Further, the user has control and is responsible for the validity of the data. The typewriters cause little disruption in offices involved in AFSC contracting since they are similar to common office equipment.

AFSC contract instruments demand a standard format on forms designed to be part of a legal contract. Forms were designed and presented to the Armed Services Procurement Regulation Committee for approval for use in the contract instruments. The committee approved 13 forms containing data elements describing the entire contracting process.

The forms were designed in such a manner that ease of use and readability were ensured.

System implementation was accomplished on a phased basis, beginning with organizations in Ohio, California, Massachusetts, Maryland, Florida, New York, New Mexico and Washington. After further development and testing, implementation will be expanded to activities in Texas, Pennsylvania, Arizona, Georgia, Colorado, Missouri and Utah as well. The diversity of locations provides quite a communications network to tie the typewriters to the ITEL Corp. AS/5 located here. Communications is accomplished on dial-up lines at 134.5 bit/sec.

Training Conducted

The Amis program office conducted training at each installation on the use of the forms while the equipment vendor conducted training on equipment operation. (Approximately 2,200 functional personnel and operators were trained to use the forms.) After training, a test period was completed. Then the system was implemented.

What did the new system accomplish?

When writing a contract, the buyer fills in a special form (Continued on Page 5/18)

Real productivity is a function of time and performance controls. The Panasonic Data Entry Terminal helps by providing simplified, immediate, error-free transmission of data by any worker, at any station, directly to the computer.

Here's how. Employees carrying identification badges insert them into a Data Entry Terminal when arriving or departing from work; changing work stations; or performing tasks with different pay scales or specific recordkeeping requirements. The employees' identities and other pertinent information are instantly transmitted to the computer.

That's it! No time card conversion to punched cards. No transposition errors. Immediate data availability.

And the Panasonic Data Entry Terminal makes source data acquisition a practicality almost anywhere. Designed for reliability, it combines a unique optical punched badge reader with advanced CMOS IC's to eliminate the need for any moving parts. The compact, lightweight enclosure is molded of high-impact material which stands up to tough industrial environments. Priced within reach, the basic unit is available with a variety of options, so you buy only the data collection capability you need.

What's more, the Terminals are designed to interface with most data processing equipment, both on-line and off-line. Frequently they will be compatible with equipment presently in use.

For added economy, any number of Panasonic Data Entry Terminals can be used on a single line without the need for an expensive multiplexer or other line controlling device.

For more information on the system that gives you tight time and cost control to improve productivity, write or call Panasonic Industrial Sales Division, 2960 Hart Drive, Franklin Park, Illinois 60131. (312) 451-1340.

Put a Panasonic Data Entry Terminal into your payroll recording system and watch your productivity improve.

Panasonic
just slightly ahead of our time

Believe. And \$5,950 is for a quantity of one. Now you can afford a genuine Datapoint for those network applications where computer power is needed but couldn't be cost-justified.

A Real Computer

Don't let the price mislead you. The 1500 contains a powerful fully programmable business computer with 32,000 bytes (8 bits & parity) of memory. Add to that an integral keyboard, video display and dual diskette drives (over 500,000 characters on-line) and you have a complete system. And there's more. A standard, built-in communications interface requires that you add only a modem to start communicating.

With Comprehensive Software

There's much more than just hardware, too. You get a comprehensive Diskette Operating System with a utility library including sort, index and index sequential access method (ISAM), a data entry language (DATAFORM®), a data processing language (DATABUS®). Like all Datapoint systems there's a common, dynamic file structure. No time consuming file format conversion necessary. You start writing application programs immediately.

Easy Concurrent Communications or Printing

The 1500 will communicate in IBM 3780 discipline, or DATAPOLL® for Datapoint-to-Datapoint communications. Auto-answer is standard. You needn't halt an ongoing data entry operation to communicate — with the 1500 you can communicate while an operator continues to enter or process data. Or, you can elect to do concurrent printing on an optional Freedom Printer™.

More Features — And a Growth Path

You'll find the 1500 full of those features you've always wanted. Inverse video for display highlighting, user program defined function keys, simple installation, and easy operator training. Programs can be remotely loaded from a central site. A system that you can adapt to your needs, not the reverse.

Since the 1500 is part of the Datapoint family, you can easily move your application programs to larger Datapoint systems without another investment in software.

Fully Supported

Each 1500 is backed by the nationwide Datapoint Field Service organization with over 90 service centers. And when you need systems or other technical advice, the Datapoint Account Managers and Systems Engineers are ready to help.

Learn More

Call your local Datapoint Sales Office. They'll send you information on how the 1500 can start saving you money now. Or write Datapoint Corporation, Marketing Communications, 9725 Datapoint Drive, San Antonio, Texas 78284.

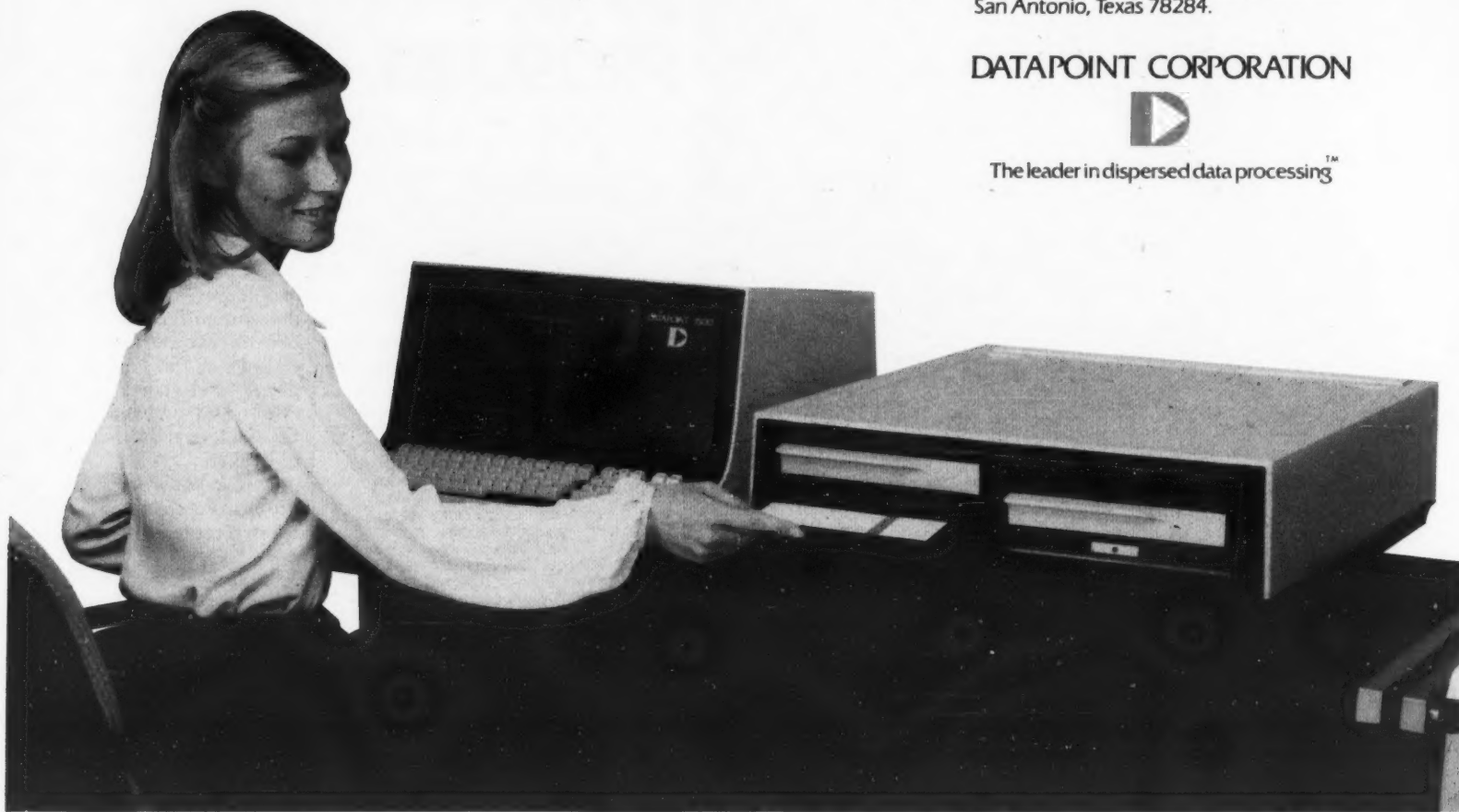
Hard to believe:

The Datapoint 1500 business computer designed to meet your network needs for just \$5,950.

DATAPoint CORPORATION



The leader in dispersed data processing™



Home Office: 9725 Datapoint Drive, San Antonio, Texas 78284 (512) 699-7151

Sales Offices: Atlanta/(404) 325-2212 • Boston/(617) 890-0440 • Chicago/(312) 298-1240 • Cincinnati/(513) 481-2600 • Cleveland/(216) 351-1775 • Columbus/(614) 890-7686 • Dallas/(214) 661-5536 • Denver/(303) 321-8286 • Des Moines/(515) 225-9070 • Detroit/(313) 855-2900 • East Hartford/(203) 289-9364 • Greensboro/(919) 299-8401 • Honolulu/(808) 833-2110 • Houston/(713) 680-2200 • Indianapolis/(317) 299-4253 • Kansas City/(913) 321-5802 • Los Angeles/(213) 385-0395 • Memphis/(901) 761-3080 • Miami/(305) 621-4335 • Milwaukee/(414) 453-1425 • Minneapolis/(612) 854-4054 • Nashville/(615) 361-5981 • New Orleans/(504) 831-8101 • Newport Beach/(714) 752-9073 • New York/(212) 971-9270 • Oklahoma City/(405) 942-8714 • Orlando/(305) 896-1940 • Philadelphia/(215) 667-9477 • Phoenix/(602) 265-3909 • Pittsburgh/(412) 344-6800 • Portland/(503) 644-5575 • Richmond/(804) 353-3858 • Rochester, N.Y./(716) 248-2616 • San Antonio/(512) 734-8982 • San Francisco/(415) 398-2888 • Seattle/(206) 455-2044 • Stamford/(203) 359-4175 • St. Louis/(314) 878-6595 • Tulsa/(918) 664-2295 • Union, N.J./(201) 964-8761 • Washington, D.C./(703) 841-7600 •

Also sales offices in 29 international cities.

Despite Several Problems Multivendor Net Eases Air Force Acquisitions

(Continued from Page S/16) rather than a draft sheet. The procurement clerk then types the form from the draft copy and at the same time records it on a magnetic card.

When all the forms for a contract instrument are typed, the procurement clerk then activates the communications feature of the typewriter and transmits the cards to the

computer. The computer validates the submitted forms and provides an error listing to the clerk.

Error Analysis

The clerk then analyzes the errors, inserts the form and card into the typewriter and corrects both the form and the card simultaneously. A corrected form is then run off

from the magnetic card, and the corrected magnetic card is transmitted to the computer for another validation cycle.

After all approvals, negotiation and signing of the contract instrument, a form is input to instruct the computer that the contract is ready to be distributed.

The system searches that contract instrument's records

for any uncorrected errors and notifies the clerk so any remaining errors can be corrected before distribution. When the contract is distributed, the computer is notified and the data is transferred from a staging file to the contract data base where it is available for query, tracking, status reports and payment purposes.

The first Amis data entry installation was completed in June 1975. Since that time, 150,000 forms have been processed through 141 machines. The error rate has been reduced from at least one error on 30% of the forms to one or more errors on less than 2% of the forms.

The replacement of manual abstracting with the automated technique has eliminated 38 manpower spaces.

Teething Pains

These accomplishments were not without the usual problems. Long-line communications problems were experienced in several instances because of carrier loss, modems out of adjustment, natural causes and several "one-of-a-kind" mishaps.

The nature of the system required the participation of many different equipment vendors on a nationwide basis. When problems developed, the predictable, initial reaction was "it is someone else's fault" or "it's not in my region." Computer reliability problems during early development, including disk and facility problems, caused more than the normal amount of headaches and complaining by users. To the functional user, any malfunction, no matter what the cause, was "computer problems."

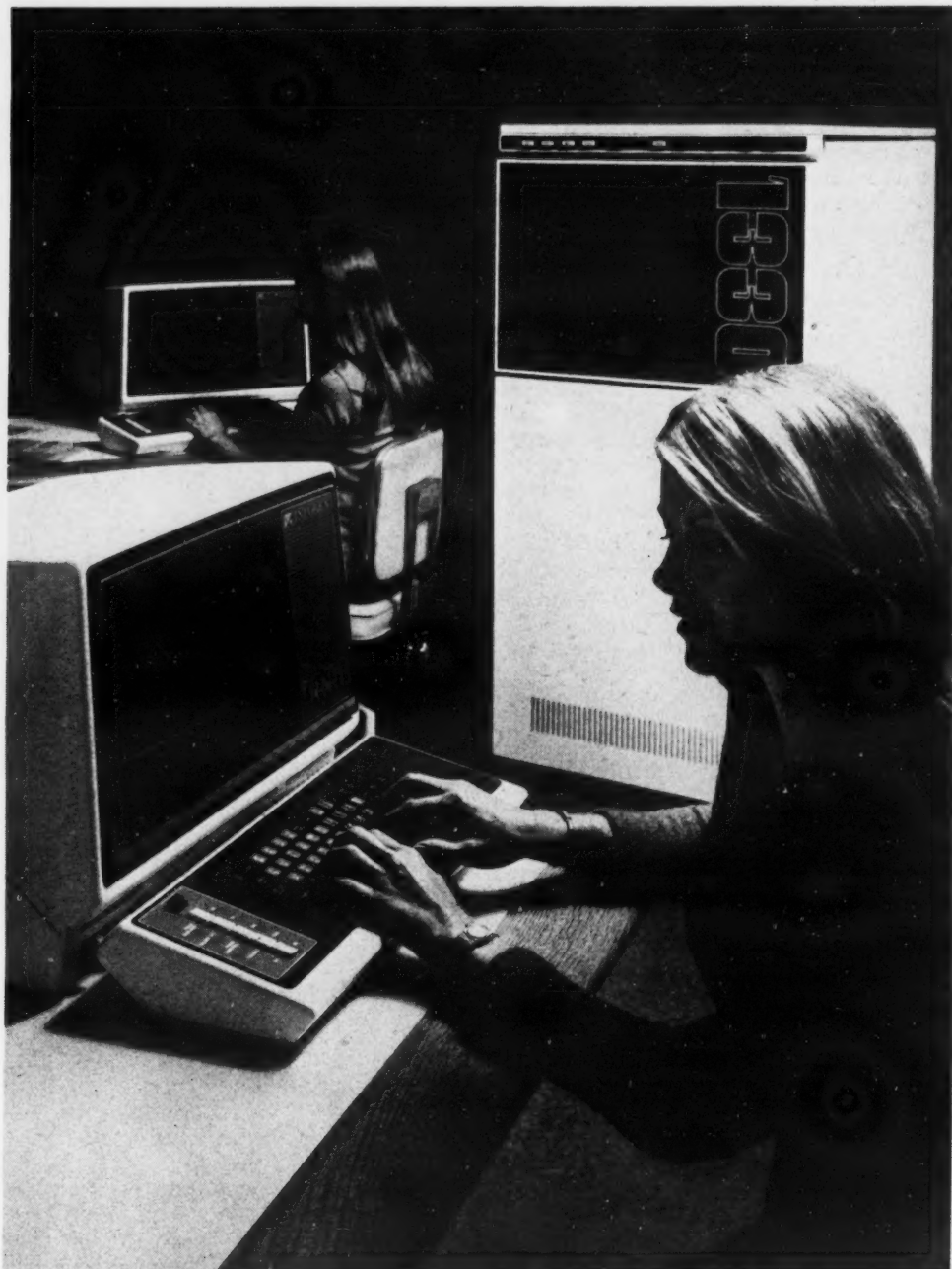
Classic Pattern

This implementation followed the classic pattern of DP implementation as far as people were concerned. When the announcement was made that the system was to be installed in an organization, people were elated.

But when use began, frustration took over as habits had to be broken.

Finally, however, as the problems were smoothed out, users accepted the new procedure.

Harbin is chief of the Program Control Office, Directorate of Procurement Data Systems for the AFSC.



With the 1330, you can consolidate remote job entry and batch data entry applications without compromising either function. The system features expandable disc storage (up to four—10 Mb. drives) foreground and background editing and bisync communications.

INFOREX: THE SIMPLEST SOLUTION TO ALL YOUR DATA ENTRY PROBLEMS.

The simplest and best solution to all your data entry problems is right here: the Inforex data entry family.

Simplest because we design them for ease of use and speed of throughput.

Best because we've been a leader in the innovation and development of key-to-disc data entry products and capabilities right from the start.

Which is why our family's got it all. From the basic keypunch replacement 1300 IKE System to the tremendously powerful max-editing System 3300.

So whatever your needs—modest, middling, or immense—the growing Inforex data entry family will meet them.

You don't have to settle for a compromise system. You don't have to sweat out an unsatisfactory price/performance choice. All you have to do is choose the system that's best for you.

And that's where an Inforex Support Team comes in. They'll help you select just what you need. They'll provide expert installation. And they'll give you the benefit of their years of experience in other installations.

But even after all that, you won't be left high and dry. Whenever and wherever you need help, an Inforex Support Team will be available with the support you need.

The Inforex data entry family. You shouldn't settle for anything less.



Inforex 1300 and 1301 offer highly cost effective data entry capability for smaller installations (4 to 8 keystations) or remote locations where you can take advantage of our communications capabilities.



The 1303 provides medium range data entry capacity, with about triple the disc capacity of the 1301. It supports up to 16 keystations and the addition of edits, table look-ups, range checks and cross-footing. The 1303 also offers communications capabilities such as spooling, HASP and RJE.



The Inforex 3300 is a powerful pre-processing system that allows you to edit data at the point of entry, enabling you to offload your mainframe. Its sophisticated editing capabilities can also handle many of those applications which you haven't had time to put on your present mainframe.

I would like more information on the following:
☐ Key-to-disc data entry ☐ Distributed processing
☐ Computerized records management
☐ I would like to talk with an Inforex Sales Representative

Name _____

Title _____

Organization _____

Address _____

City _____

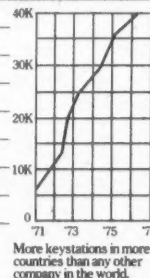
State _____ Zip _____

Telephone _____

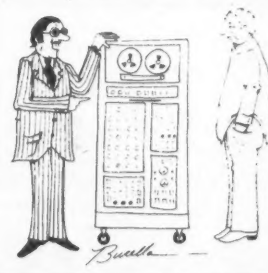
CW-4

Offices in major cities throughout the United States, Canada and Europe. Distributors worldwide.

INFOREX
Inforex, Inc., Dept. 321, 21 North Avenue, Burlington, Mass. 01803



USED COMPUTERS



'... And This One Was Only Used on Sundays by a Little Old Technician From Pasadena.'

See the System 1330 at the Computer Caravan—Expo '78.

Yale's Data Entry Graduates to Key-to-Disk

(Continued from Page 5/11)
vidual operators consistently at .1% and .2%. As low as the error rates are, Kaplan pointed out that most of the errors are actually rectified, either by the operators correcting themselves on-the-spot or through the verify operation.

Forms Design

The statistics feature has also given Kaplan and his staff a better idea of what forms design is all about. An index is obtained that indicates how difficult it is to key from each form.

The degree of difficulty is a formula that factors the average keystrokes per hour for a given form compared to the average strokes for all forms compared to the average number of keystrokes for a form for the entire period of usage. "Then we look at what makes a form easy," he explained. "Some items are self-evident like legible handwriting, the use of computer turn-around documents or the use of tables to minimize keying

and therefore the risk of error. Others are more difficult. After we analyze all of the items that go into making up a good form, we try and incorporate them into all our forms.

"Of course, there are not only bad forms, there are bad forms for good reasons. By balancing those forms designed for users, you sometimes discover that what is easy for the data entry operator is not always the best way

to fill out the form," Kaplan noted.

Because of the system's ability to prompt operators and skip from field to field instead of the column-by-column coincidence typical of keypunch devices, ADS operators are also finding that bad forms aren't as bad as they used to be.

Kaplan has high praise for his data entry operators, whom he described as supe-

rior workers. With the Model 74 system, not only are error rates well under what they used to be, throughput is at least 25% to 30% greater than with keypunch machines. ADS operators now average 10,200 keystroke/hour with the fastest operator clipping along at a 14,000-plus keystroke average.

Kaplan said the system can pinpoint those operators who are not performing as well as

they might. This allows him to offer them more training where they are weak and assign them tasks they perform particularly well.

In this way, the strengths of each individual can be utilized best. "Everyone benefits. The operator is happier and Yale gets more accomplished than it otherwise would. Knowing how you are doing and what to expect is the key to doing better," he said.

Unit Speeds Printer's Job

(Continued from Page 5/14)
gained by streamlining the paper-tape punching side of the Linotype operation. Keyboard operation of the direct, key-to-paper-tape units is complicated, and the key positions have never been standardized for each make. The operator must learn the special layout of each machine. The operator also has to memorize a great deal of special coding information such as the type sizes used by each bank, type styles and other special requirements. This special data is kept in the MDS system's memory and will be automatically punched by the tapes without operator intervention.

By eliminating much of the operator's special memory work the MDS system is more easily learned. Helen Zajicek, supervisor of the RMBN tape punching department, says she expects she will be able to train operators in two to four weeks, a job that now takes six to 12 weeks.



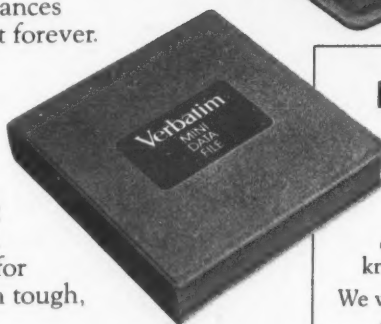
'Let's See How Smart It Really Is. Ask It "Why Did the Chicken Cross the Road?"'

Give your minidisks a happy home.



You know your VERBATIM™ minidisks are tough. Long-lived. Rugged. Now, chances are good that your minidisks will last forever. The reason? The Mini Data File.

ITC's Mini Data File is a neat new way to store and ship your VERBATIM minidisks. Made from high-impact plastic, the Mini Data File is lightweight and convenient. It protects your data in ways that a file drawer never could. No more dust, for instance. And no more damage from tough, everyday handling.



FREE!

MINI DATA FILE from ITC.

For a limited time, ITC will give you this \$4.50 storage box free when you buy ten VERBATIM minidisks.

Check your local VERBATIM dealer or computer suppliers store. And if you don't know a dealer near you, call us.

We want to see your data happy and safe.

Call Toll Free: (1) 800-821-7700, Ext. 515

(In Missouri call:
800-892-7655, Ext. 515)

Information Terminals Corp.
323 Soquel Way, Sunnyvale, CA 94086
(408) 245-4400



Dema Working to Meet Data Entry Challenges

(Continued from Page S/2)

years ago between the computer facility and the keypunch room has been radically altered. The key-to-disk system encompasses almost all computer activities:

- Data keying.
- Data verifications.
- All computer operations considerations with tape handling, disk control and others.
- Data entry programs.

Programming that involves editing, controlling and checking the accuracy of the data produced no longer needs to be done on the main computer system. Almost all of these activities can be done within the data entry environment. We can therefore be totally responsible for the integrity of the data we produce.

New Directions

The new directions of our profession are numerous. The challenges and opportunities multiply with the advance of technology.

Data entry is coming of age, and Dema is active in helping those involved in capturing data respond to the present and to help shape the future. During its short existence, Dema has taken many concrete steps to ensure its role as "change maker" in the DP industry. It is a tool for its members' professional growth.

Dema's monthly newsletter provides an opportunity for members to exchange information, present new ideas, communicate problems and solutions and keep informed of the newest directions in data entry.

Dema is conducting its second equipment evaluating survey. Several new benefits are expected from this survey:

- Members will be able to communicate with other members in similar facilities to obtain first-hand knowledge of equipment and its utilization.



'There's a Rather Severe Penalty for Using the Computer to Do Cross-words.'

DATA ENTRY PROBLEM SOLVER

World's leading authorities present—Keys to successful Data Entry operations. New 275 page Manager's "How To" guide—"DATA ENTRY PROBLEM SOLVER"—Tells how to

- INCREASE KEYSTROKING RATES
- SELECT SUCCESSFUL OPERATORS
- DECREASE COSTS AND COMPLAINTS
- STOP CONTINUAL ABSENTEEISM
- REDUCE OPERATOR TURNOVER
- BUILD DEPARTMENT MORALE
- SUPERVISE WITHOUT PROBLEMS

FREE DETAILS

DATA ENTRY DIGEST
10522 Ridgeway Dr., Santa Ana,
Calif. 92705, (714) 838-2060

• Recommendations for beneficial changes should result in future equipment changes because those participating in the survey are the pragmatic authorities in the field.

• Future trends in data capture will be ascertained.

• A Dema salary survey is in preparation.

Dema's regional seminars and local meetings provide participants with an opportunity to exchange ideas while obtaining first-hand knowledge of how other facilities operate. Regional Seminars for 1978 were held in Houston in February and Washington, D.C., in March. The next Dema seminar is scheduled for the Hospitality Inn in Columbus, Ohio, on May 11-12.

The second annual Dema Conference will be held at the Sheraton Harbor Island Hotel, San Diego, Calif. Oct. 30-Nov. 1. Here data entry professionals will have an opportunity to share the most current and comprehensive body of knowledge in data entry through seminars, panel discussions, workshops, equipment exhibits and informal exchanges.

Concern for Education

Another primary concern of Dema is the continual education of its members and their staffs. We believe we can all grow from our willingness to share our best with each other. We exchange this information in our newsletter, our regional seminars and our annual meetings.

The future of our profession offers unlimited potential. Constant demands will be made on our abilities to keep pace with a rapidly changing technology. Within a few years, almost every person will in some way be directly interacting with computers.

We as data entry professionals will find ourselves facing new challenges to define, control and ensure that data flows accurately, responsively, timely and competitively. In addition, we will find many opportunities to assist people as human beings to work competently with these machines. We look forward to — and welcome — these challenges.

Bodek is executive director for Dema. Dema can be reached at 16E Weavers' Hill, Greenwich, Conn. 06830.

Sycor announces that's shamel (Except for

We're proud to introduce an on-line system that offers as much as the big guy's system. For a lot less.

It's the new Sycor 290—a 3270-compatible display system that can save you up to 25% over a three-and-a-half-year lease. And even more when you purchase.

An outgrowth of our long experience with on-line systems, the Sycor 290 is available in remote and local configurations that support up to 16 CRTs and printers in any combination. And in a remote mini-cluster unit that supports a combination of up to eight CRTs and printers.

Remote configurations use either Binary Synchronous (BSC) or Synchronous Data Link Control (SDLC) line protocol at speeds from 1200 to 9600 bps. This fast transmission time allows you to better control your line costs and to configure your network for optimum performance.

Our new, larger display screens are adjustable for character intensity and

contrast. And our movable keyboards and glare filters help your operators work comfortably and productively.



Special diagnostics mean fast service.

Service for the Sycor 290 can be sped up by using our sophisticated diagnostic programs. You can run them to pinpoint problems quickly and easily. And alert the Sycor field engineer to the problem when you call for service.

Records Amalgamated

OCR Solves Huge British Data Entry Problem

Special to CW
NEWCASTLE-ON-TYNE, En-
gland — The UK's Department of
Health and Social Security (DHSS)
realized in 1972 it would soon face one
of the most massive data entry prob-
lems ever encountered. As the central
recordkeeper for the entire population
of Great Britain, DHSS had to track 40
million persons enrolled in the British
social security system and transfer the
records for each person from a manual
to an automatic system.

Just to keep up with current informa-
tion, there was a daily data entry re-
quirement of 5.5 million characters.

The new function was an amalgama-
tion from several different agencies,

each having some fragment of health
and benefit records. Some of the re-
quired information was on handwrit-
ten cards, some in data bases and some
records were incomplete. All records
had to be updated and centralized.

Master records needed to be created
so each person's payment into the sys-
tem and his pension entitlements were
up to date. This included salary deduc-
tions, sickness, unemployment, pen-
sion contributions and entitlement cal-
culations.

Moreover, DHSS had a short time-
frame in which to complete planning
for a totally automated system. It had
to be operational by 1976, and it had to
be able to handle a new pension

scheme scheduled to go into effect 18
months later — April 1978.

The DHSS first made a determina-
tion that any data entry by keying was
impractical. The number of personnel
and the amount of budget and space
required for this type of entry made
keying inconceivable.

Optical Alternative

Optical scanning systems were eval-
uated as an alternative. The chief crite-
rion that had to be met by optical scan-
ners was the ability to read mixed al-
phanumeric handprinting (from 1,400
to 1,600 clerks) at a throughput speed
of more than 120 char/sec with at least
a 94% recognition factor. In addition,

accuracy had to reach 99.9% after opti-
cal character reader (OCR) reject char-
acters were keyed.

DHSS eventually turned to an Infor-
mation International, Inc. Graftix I
Data Base Conversion System, which
contained the previously developed
Mixed Alphanumeric Handprint soft-
ware package.

Documents for the system were mi-
crofilmed by standard 16mm rotary
cameras with a resolution of 70 line
pair/min. These were then scanned by
the OCR, with rejects diverted to CRT
terminals for clerical correction.

In April 1976 the system went "on-
line, on-time and on-budget," accord-
ing to James Torbet, the systems man-
ager for the British government. Total
price of the system ran between \$2
million and \$3 million.

First Task

The first task to be done on the Graf-
ix I was to transfer the National Insur-
ance benefit information, which had
accumulated over many years, to the
main computer. All told, there were 36
million accounts, with some of the data
available as computer printouts and
other documents available only on the
clerical hand-printed record.

After slightly more than one year,
this voluminous updating task was
completed by a staff of only 25 per-
sons.

At the same time, eight other forms
were being read in an operational envi-
ronment. These forms contained al-
phabetic numeric and totally mixed al-
phanumeric fields, including some
hand-printed and some line-printed
characters.

First Year Figures

By April 1977, after about a year of
on-line operation, a total of 31 million
items had been processed, each item
containing 14 alphanumeric line-
printed characters and up to 26 hand-
printed characters. In addition, 1.7
million forms with up to 33 hand-
printed characters covering the full al-
phabetic and numeric ranges and
250,000 forms containing mixed hand-
print and line-print fields have also
been read in a live environment.

A total of more than 1.25 billion
characters were processed in just the
first year of operation. That count has
now exceeded two billion characters.
Yet the system requires only a two-
shift, five-day work week.

(Continued on Page S/25)

an on-line system essly "me, too." the price.)

Trouble-shooting is on target from the
moment he walks in. With more than
400 Sycor field engineers within a half-
hour drive of 1750 North American
cities, downtime stays way down.

Get a reliable Sprinter running for you.

The Sycor Sprinter™ can satisfy your
printer requirements, too. The bidirec-
tional, microprocessor-controlled
printer is available in 66-, 120- and
180-cps models to give you system-
tailored flexibility.

Sycor builds every unit, controls
every phase of Sprinter's design
and production. So you're assured of
more operational reliability. By eliminat-
ing many of the mechanical parts that

can go haywire, our Sprinters stay
running longer.

Sycor also has light-pens, badge
readers and key locks. In fact, we have
just about everything you need for
on-line applications.

Get a line on Sycor. Call 800-521-2838.

Most importantly, Sycor can really help
you save big on your system lease or
purchase costs. To find out how much,
call Tony Fazio, V.P. Sales, at our
toll-free number: 800-521-2838. Or
write Sycor, Inc., Corporate Offices, Ann
Arbor, MI 48104.

Better yet, call a nearby sales office.
We're in the Yellow Pages under "Data
Processing Equipment."

Sycor puts computer power where the work is.

SYCOR

**On-line
key entry
for
CICS users!**

See page 8 in the Special
Report section for details.

Grocery Chain Pleased By Portable Data Entry

(Continued from Page S/5)
he's looking at a stocked shelf."

The ripple effect of electronic ordering quickly extended to another area of Ralphs' operations, Borneman continued.

"Our vice-president of warehousing and transportation has found he benefited greatly from the system.

"Before we went to electronic ordering with the MSI terminals, we were making over 27

deliveries per week per store.

"Now we've eliminated over 10% of those deliveries because of the improved system. The shorter lead time from ordering to delivery permitted a reduction in the number of deliveries each week, particularly to the smaller stores, with no reduction in response to customer demand," he said.

Like many large supermarket users of electronic ordering equipment, Ralphs compiles

its orders in the early morning hours. At 6 a.m. the company's central computer at corporate headquarters in Compton beings the first of four polling cycles for certain stores and types of merchandise. Subsequent polls are conducted at 9 and 11 a.m. and 12:30 p.m. for other stores and products.

If the Compton MSI receiver fails to get a response from a store on the first try, it auto-

matically polls that store twice more during that cycle. If a store doesn't transmit an order by the third try, the MSI receiver operator calls the store to make contact and complete the transmission. Only 45 minutes are allowed for each polling cycle. In little more than three hours, the orders must be ready to be sent to the appropriate Ralphs warehouse to be filled.

"There's little time for mis-

takes in this thing," Borneman asserted. "If nearly all the stores weren't on-line and ready to transmit at polling time, our operators would be swamped."

At present, approximately one of every 10 polls generates a problem call, according to Borneman. The cause of the problem could be any number of things. "The store might simply be late in getting the order ready or the person who did the ordering might not have hooked up the terminal properly.

One in Ten

"Out of every 10 problem calls, perhaps one involves a problem with the MSI terminal. And we're not sure all of these are really equipment problems. If a clerk wrote on the tape but didn't get anything on the tape, was it an equipment failure or an operator error? At this time we don't have a way of knowing," he said.

When a store is unable to transmit an order via its terminal, Ralphs' DP center generates a substitute order from the computer file of standing orders kept ready for such emergencies. The problem is usually resolved by a service call, and subsequent orders can be transmitted via the terminal, Borneman reported.

Of the 1,000 scheduled order transmissions from Ralphs stores each week, only a few failures can be ascribed to the terminal, Borneman reported.

"Right now we're running about 20 service calls a week," Borneman continued, "I think that's too high, but MSI says we use the terminals more than anyone else."

Borneman said the MSI terminals are handled by up to 1,000 Ralphs store employees each week. The company is currently planning a refresher course in the use of the terminals and will select from each store one person who uses the MSI equipment. That person will be responsible for refresher training of others at the store in the correct use and care of the terminals.

Through this program, Ralphs hopes to reduce the number of service calls to 10 or even five a week, Borneman said.

'Nixdorf showed us complete distributed processing capability and growth flexibility with its ENTREX systems—and saved us money, too!'

General Telephone Directory Company

Paul Willis, Sales
Director—National
Yellow Pages Service

Bob Alread, Director
of Data Processing

ENTREX Series 600. A Nixdorf Product.

"Tight schedules, last-minute changes and absolute accuracy are ways of life in directory publishing," asserts Willis. "Now we can finalize data at seven coast-to-coast offices, and transmit much faster...to give our customers more lead time, while meeting publication deadlines!"

"With Entrex Series 600 systems from Nixdorf," states Alread, "we don't compromise cost or capability. They perform multiple functions simultaneously. They're extremely easy to program and operate. And these flexible, clustered systems allow us to simply add terminals at about \$80 per month, vs. spending \$250-\$300 with our previous system!"

See what The Nixdorf Challenge can do for you.

Take *The Nixdorf Challenge*: Let us demonstrate our system capabilities—then compare! In data entry, distributed processing and data communications, Nixdorf is a worldwide mini computer leader...with over 100 sales and service centers coast-to-coast—dedicated to excellence and customer satisfaction.

Small business systems, too, with applications software.

That same dedication pays off if you need a stand-alone system and applications aid. Challenge us to show how NIDAS/8870 systems can provide more manageable management data than you thought possible.

Call Toll Free or write, Nixdorf Computer Corporation, 168 Middlesex Turnpike, Burlington, MA 01803.

More than 60,000 systems installed.
All over the world.

NIXDORF
COMPUTER

MAIL THIS COUPON OR CALL
TOLL FREE 800/225-1484 EXT. 365

Please send information on:
☐ Entrex Series 600 Systems
☐ NIDAS/8870 Systems
☐ Have a sales person call.

To:
Nixdorf Computer Corporation
Dept. CW-48
168 Middlesex Turnpike
Burlington, MA 01803

Name _____ Title _____
Firm _____ Phone _____
Address _____
City _____ State _____ Zip _____
Type of Business/Industry _____

KEY PUNCHING

ANY VOLUME

• Tape • Card

BLODGETT

center for data processing

801-278-4491

Salt Lake - Portland, Ore.
Bremerton & Auburn, WA

Look closely. Very closely at our new Model 85 remote information system. How many functions do you see?

There are more than meet the eye.

Batch communications and volume data entry should be easy to spot.

And on-line file management and stand-alone processing should be apparent to those who've kept up with Data 100's continuous progress in distributed processing.

But your needs keep growing.

And so does our commitment to fulfill those needs.

Our Model 85 remote information system introduces the functions of remote file management and high level language processing at your remote sites efficiently and economically.

Model 85 is a display based system featuring up to 100MB disk storage, 15 interactive work stations, a multitasking operating system and concurrent communications.

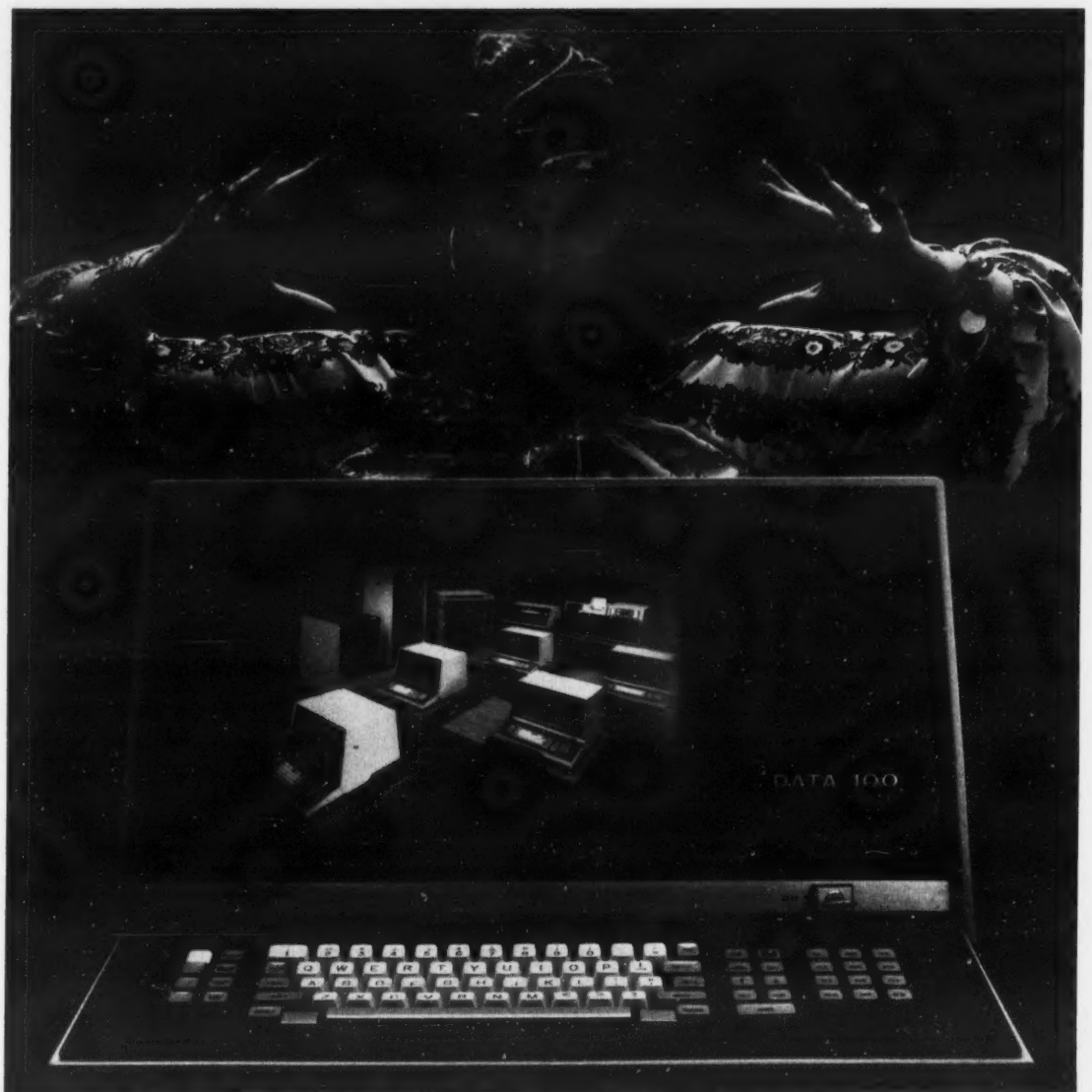
For ease of use, two disk based high level languages are available: RPGII and COBOL. With COBOL, a *local* compiler lets you compile programs on your Model 85. And a *cross* compiler allows stronger central site control by permitting you to compile and debug COBOL programs on the mainframe for execution on your Model 85.

The Model 85 gives your network the best of both worlds. The degree of central site control you need *and* remote processing capabilities to reduce communications costs and mainframe processing time.

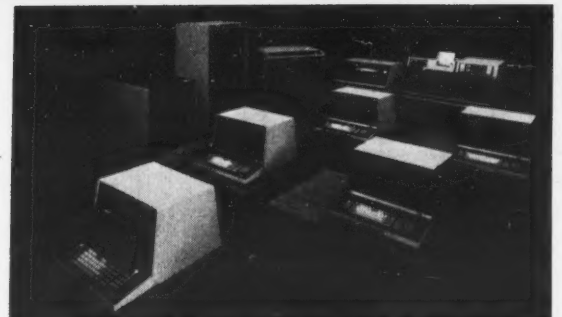
And the Model 85 can communicate with our other proven Data 100 multifunction data processing products.

Now look closely at *your* growing needs for multifunction data processing.

Then call your nearest Data 100 sales office or one of the numbers listed below.



DATA 100
CORPORATION
multifunction data processing



LOS ANGELES 213/645-4300 • SAN FRANCISCO 415/546-6000 • CHICAGO 312/992-0850 • BOSTON 617/848-6100 • DETROIT 313/358-5065 •
MINNEAPOLIS 612/941-6500 • NEW YORK 212/867-6200 • PITTSBURGH 412/391-5425 • HOUSTON 713/784-4130 • WASHINGTON D.C. 703/790-5560 •
WOODBRIIDGE N.J. 201/634-7800 • ATLANTA 404/453-3895 • ST. LOUIS 314/878-4911 • TORONTO 416/494-0434 • MONTREAL 514/761-5894 •
LONDON ENGLAND (05827) 63161 • MELBOURNE AUSTRALIA (03) 267-3544 • FRANKFURT GERMANY 72-04-71 • PARIS FRANCE 630-2144

Source Data Entry Seen as Step Toward DDP

(Continued from Page S/2)

way from collection to processing to dissemination of data.

This presents some disadvantages: It is necessary to bring data to a central location; data entry is a dedicated function with its attendant costs for personnel, equipment and supplies; data must be recopied in various places giving rise to errors (cost, delays); and procedural rigidity, overwhelming paperwork and lack of timeliness of work processes can result.

Variety of Alternatives

Let us assume at this point that our user has reached the conclusion he must do something or collapse under a mountain of paperwork. In his search for a way out, he has been exposed to a variety of products that offer potential solutions to his predicament.

Vendors of intelligent terminals, key-to-disk systems, transaction terminals, CRTs, teleprinters, media scanning equipment and interactive terminals have all shouted the benefits of their approach. How is the user to decide which alternative is best? Let's focus on some of the steps that he might take.

First, he must evaluate the current situation by:

- Ascertaining the speed, scope and volume of his present system.
- Determining where the problems are.

• Assessing whether he needs an entirely new approach, modification to the current one, an upgrade of installed equipment or additional personnel.

Secondly, he should assess geographical requirements by:

- Determining points of data origination, collection and dissemination.
- Assessing how data is ultimately processed.
- Determining how scattered each function is.

Next, he should consider timeliness as a factor by answering the following questions:

- During what times in the business cycle must data move?
- What should the response time at the terminal be (e.g., is the customer waiting on the phone?)?
- Is real-time access to the data base required?

• Does batched data require daily turnaround?

Fourth, the user should estimate the following data volumes:

- Size of the data base (local storage requirements).
- Volume of data keyed daily (peak periods?).
- Storage requirements if communications link goes down.
- Volume of data that must move between points.

The next step is considering the costs of:

- Equipment (purchase, maintenance, operation).
- Personnel.
- Supplies (paper, computer media).
- Overhead (space, utilities).

Sixth, an evaluation of possible new equipment should consider:

- The usefulness and capability of the units.
- Ease of installation and operation.
- Reliability and maintainability.
- Modular growth capability.
- All equipment-related costs.

Seventh, the user should determine growth requirements:

- Current system capacity.
- Where loads are expected to increase.
- Requirements for expandable, field-upgradable equipment.

Then vendors should be evaluated in the following areas:

- Compatible systems: Since source data entry is not the last step into DDP, the selected equipment must provide both data entry and remote processing potential and be capable of expansion to other functions as well. Once the equipment is installed, it should be able to grow in usefulness to support additional applications.
- Nationwide (worldwide) service and support organization: When the

user may require expansion into remote areas, he must select a vendor capable of servicing outlying areas.

• Expertise in expected growth areas: Can the vendor move the user into extended usefulness and provide new fully supported products to help the user achieve his long-range goals? Few users can predict their DDP requirements very far into the future and the ability of the vendor to offer flexible growth alternatives is very important.

Selection Begins

Once these issues have been evaluated, the selection of a source data entry system can begin in earnest. Although resistance to procedural change is strong, costs and volumes are forcing users to move to more ca-

pable kinds of equipment.

In this migration, the user is looking for more than just replacement of current data entry equipment; he wants more efficiency, expanded capability, flexibility, growth and new methods to help him get a better handle on overall data processing costs.

Because source data entry means putting terminals into the business environment where daily transactions occur, the data entry function can become a by-product of clerical transactions. Therefore, data entry as a distinct function begins to fade into an integral part of the computational process.

However, data entry is not the only objective. Often, output is as impor-

(Continued on Page S/25)

SYSTEM 70

The Intelligent Network Terminal that does it all.

You need intelligent source data entry. System 70's got it. System 70 reduces keypunching costs and increases reliability. And, it's got ADDS*PLUS, the special data entry language that makes customizing data entry forms a breeze.

You need communications capability. System 70's got it. System 70 provides remote sites with immediate information access to the central data base. And, it fits simply and easily into almost any new or existing network using any of several communication protocols including: Teletypewriter, IBM 3780 and Burroughs. System 70 makes it **all** easy.

You need local processing. System 70's got it. Powerful programming languages such as ADDS*BASIC and ADDS*FORTRAN make it easy to accomplish local data processing functions on System 70.

You need a remote print station. System 70's got it. Distant offices generate hard copy using any of several ADDS printers ranging in speed from 30 cps to 340 lines per minute. No network terminal does it all like System 70.

Because you need quality and reliability, you've got it. ADDS reputation for designing and building the finest equipment available is unsurpassed.

Quality, Reliability and Integrity. It all adds up to ADDS.

ADDS

Applied Digital Data Systems Inc.
100 Marcus Blvd., Hauppauge, N.Y. 11787
Telephone: (516) 231-5400

I need more information on the System 70.

Name _____

Firm _____

Title _____

Address _____

City _____

State _____

Zip _____

Phone _____

OCR Solves Problem in UK

(Continued from Page S/21)

After two years of operation, the throughput average remains about 5.5 million characters per day. This is total throughput, including loading film, reading, reject correction, new applications, testing, editing of data and writing magnetic tapes.

Additional Software

Only one piece of additional software has been acquired by the DHSS. This is a package for new forms generation.

The overall reject rate of the system is under .8%, meaning that 99.2% of all data, alphanumeric and mixed hand-printed and machine-printed data is recognized automatically. Rejects are converted at special on-line time-shared terminals without slowing the system.

Because of these low reject rates, it has not been necessary to establish feedback procedures which require constant evaluation and retraining of data entry clerks. Output from the Graftix I system is magnetic tape formatted for the DHSS' main computer system.

The DHSS has had a software package developed and soon plans to implement a magnetic tape-to-film-to-magnetic tape conversion on the Graftix I. The purpose is to store records in a format that can be retrieved digitally after an indefinite period.

The DHSS also plans to expand the system's use to reading books, similar to other Graftix I users. The concept is to convert library catalogs and other technical documents into a digital format for updating and republication.

Source Data Entry Viewed As Interim Step to DDP

(Continued from Page S/24)

tant as input for printed reports, visual data observation or various forms of feedback from an application program output system.

Multifunction System

By applying more intelligence in the data capture area, there is less dependence upon the remote host processor to accomplish the desired tasks. If the local intelligence is minicomputer-based, we have the potential for what is probably the most effective source data equipment of all — the multifunction terminal system.

Simply stated, a multifunction system is able to concurrently support

several methods of data entry, plus local processing and communications in the same equipment. Typically these functions include:

- Remote batch.
- Keyboard entry.
- Transaction processing.
- Remote printing.
- Inquiry/response applications.
- Communications.
- Local processing.

Any intelligent terminal helps to address some of the problems mentioned earlier such as errors, inflexibility and untimeliness of the entry process. This is accomplished by reduced keystrokes, increased editing/validation, tighter error control and communications.

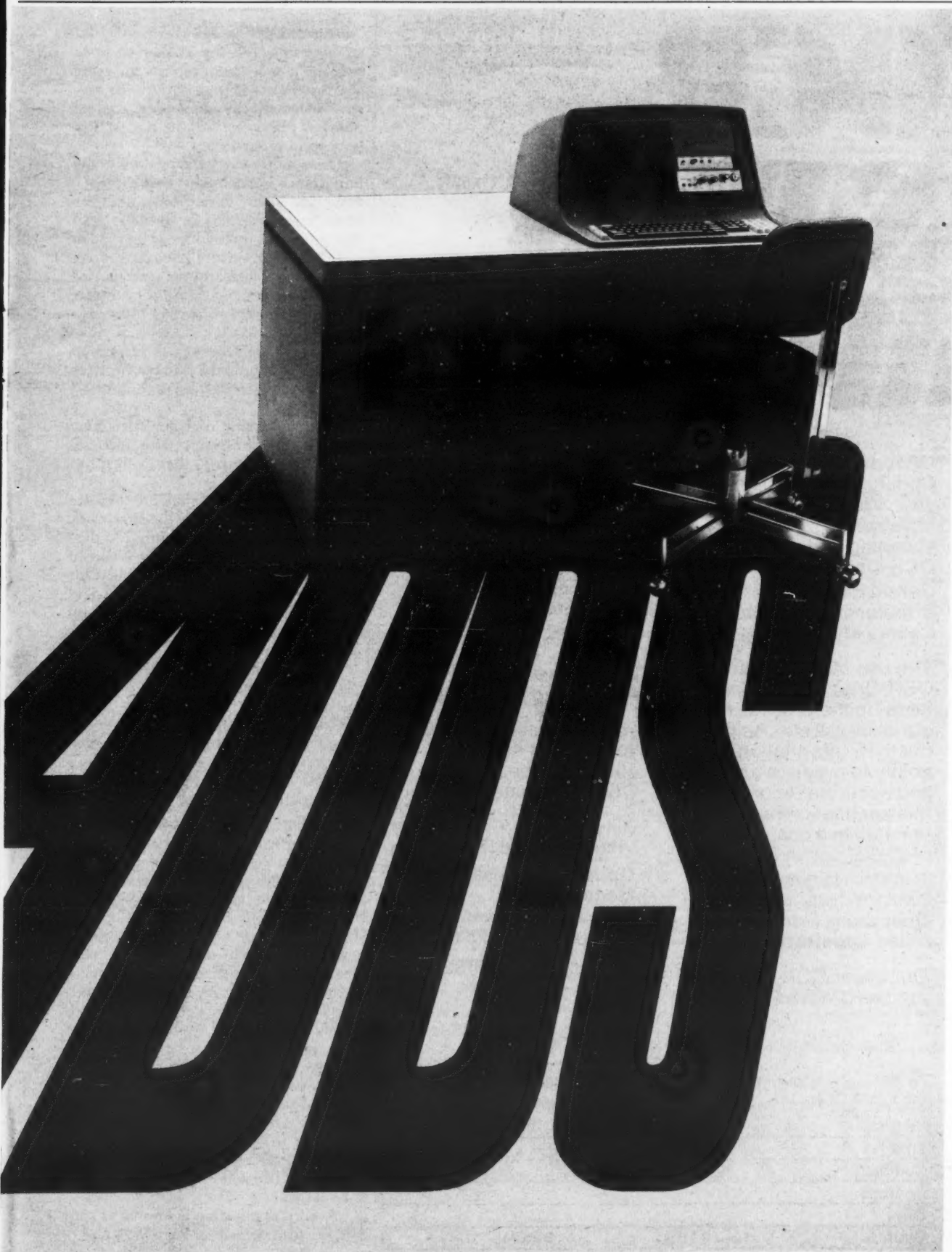
Beyond this, a multifunction system brings some of the following benefits:

- Equipment sharing.
- Compatible languages.
- Shared common data files and access methods.
- Local processing in higher level languages.
- Efficient utilization of communications facilities.
- Input from a variety of data entry terminals.

The adoption of a multifunction system allows a user to realize immediate benefits resulting from increased error control/accuracy, timeliness of data and cost savings as a result of equipment sharing. What may formerly have required several different kinds of equipment (for example, remote batch terminals, interactive transaction terminals and data entry stations) can now be accomplished in a shared minicomputer-based terminal system.

But the ultimate choice in selecting a source data entry system will depend upon careful evaluation of available equipment, proper assessment of the user's current situation and selection of a vendor who can grow with the user's requirements. The methodology suggested in this discussion should help the reader in his decision.

Doctor is a senior product manager for intelligent terminal systems at Honeywell Information Systems, Inc. in Waltham, Mass.



PEOPLE

are the most important aspect of any data entry installation. The effective management of data entry personnel is a key to increasing productivity.

THE PEOPLE SIDE OF DATA ENTRY, MIC's best-selling publication, contains 40 pages of revealing insights into this neglected area of management. Some of the topics include:

- Motivating employees
- Measuring operator productivity
- Establishing standards
- The changing role of the data entry manager

THE PEOPLE SIDE OF DATA ENTRY is available for \$15. To order, send a check to:

MIC Management Information Corporation
140 Barclay Center
Cherry Hill, N. J. 08034

**FOR FASTER ORDERING,
CALL (609) 428-1020**

OCR Unit Captures Employee Time Card Data

(Continued from Page S/4)

labor). There is also space for the employee to void an entry made in error, which is validated by initialing.

Preprinted control information on each card includes the date and the employee's name. At the top are preprinted numbers showing the employee exactly how each is to be written.

"The new forms gave us an opportunity to re-emphasize the importance of the time card, which too many people view as a necessary evil," Anderson said.

"We prepared a 10 minute film that began by stressing the importance of time card data, both to the employee and to the company. We reminded employees that their time cards serve as

actual cost controls on each job EDO has in process and that from them we distribute costs to contracts and prepare bills," he noted.

The film also explained how information is entered, step by step. Immediately afterwards, each employee practiced printing on the new forms.

"We moved deliberately during the transition period," Schmand said. "Our IBM 3886 arrived in December 1974, and we began processing the new time forms in March of the following year. As anticipated, we had a fairly high reject rate at first, but this was gradually brought under control, especially with the arrival of the 'video collect' feature four months later."

As the time forms are fed through the

OCR reader, any number that cannot be read is flashed onto the screen of an IBM 3277 CRT terminal. A payroll section member seated at the CRT terminal enters the correct number on a keyboard, and the machine continues processing. The reject rate is now at a low 5%, and improving steadily. Whenever the 3886 cannot read a number, that fact is recorded. A report is issued each month identifying the employee and the number of errors incurred by week. This report provides trend data allowing segregation of the occasional error maker from the habitual error maker.

"With this information, we recover the actual source document and get back to each employee to show them what they are doing wrong," William

L. McCaw, manager of personnel administration noted. "By and large, everyone cooperates fully and has accepted the new time card — and every time we have to go back to anyone we re-emphasize the importance of this document. The program is a solid success, especially when you consider we're scanning 750 time cards daily, each with about 50 characters — or more than 200,000 characters a week."

"Interestingly enough, a number of our problems have been with people at higher management levels, who are used to writing with flourishes," he continued. "We view this as a continual training program, and of course we train new employees in OCR hand-printing as part of their indoctrination."

Source Traceability

Data read by the 3886 is transferred to magnetic tape and is then used to produce management reports the same day. As each card is processed, the system automatically applies a control number, providing infinite traceability back to the source card.

"There's no way of overstating the importance of such tight cost control," Anderson said. "Periodically, auditors from federal regulatory agencies step into our plant unannounced and make spot checks to ensure our charges are valid. They will ask to see various employees' badges and then verify the accuracy of charges shown on their paycards."

"Our new OCR time cards have been government audited a number of times and are fully accepted by the auditors," he said.

Swift processing of labor costs permits faster correlation with material and overhead costs — that in turn has led to faster billing.

"Government people tell me they are hit with a flood of bills the first week after the close of each month," Anderson said. "All they can do is move them through as fast as possible. Our bills beat the flood by about a day, and I've actually been thanked for this by the defense agencies. Even more important is the fact that we get paid faster, which of course helps our cash flow and reduces interest expenses considerably."

The time-card application alone has more than paid for the OCR reader. Since it is used just about two hours a day for this purpose, plenty of time is left for other work.

Another application is EDO's employee efficiency rating system. Every quarter, supervisors rate employees as part of a job performance review that serves as the basis for pay increases. The old system involved developing a total efficiency score for the quarter, then factoring in the number of years employed to determine a total status score. The necessary calculations were performed in the Personnel Department and required 80 hours work every quarter.

Now, the supervisor follows the same procedure but makes the entries on an OCR form. The data is entered into the system and passed against employee files in the computer to perform the calculations and print the final score. The Total system time required is two hours.

A third application is known as com-
(Continued on Page S/29)

"OCR SAVES MONEY"

Quotes from just a few of our users

"Our Laser OCR-One has enabled us to reduce our keypunching staff by over 50%. The savings from this alone amount to about \$10,000 a month."

George M. Jordan
Systems Analyst
Westinghouse Credit Corporation

"OCR data entry saves Erie County, NY \$300,000 a year. We really couldn't have gotten by without scanning and our Laser OCR-One."

Gerald E. Wilson
Director of Data Processing
County of Erie, NY

"The use of the Laser OCR-One is a significant factor in the processing of our daily warehouse productivity information. Our ability to produce timely and accurate reports for this application has resulted in a cost savings of \$5,000 per week."

James N. Hickey
Data Processing
Operations Manager
Allied Supermarkets, Inc.

"Our Laser OCR-One scanner has given us the ability

to balance taxes faster than it's ever been done before. In addition, handling the county payroll with scanning has reduced our data processing costs substantially."

Charles E. Martin
Director
Lake County Data Processing Agency, IN

For information on how you can cut data entry costs with the Laser OCR-One system, contact

Billy Graham
Vice President/Marketing
Optical Business Machines, Inc.
804 W. New Haven Avenue
Melbourne, FL 32901

Call toll-free (800) 327-6429



I'd like more information about the Laser OCR-One

☐ send descriptive literature
☐ have a salesman call me

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

A

First we reduced your processing workload. Now we've reduced the price.

\$4995*

When we introduced our powerful Model 770 Intelligent Terminal, we knew it would reduce your workload. We told you how it would ease the burden on your host computer and reduce your data communications costs. And we told you that by preprocessing your data at the source, the 770 would reduce errors, as well as delays in transmitting data (you could do it at high speed during times when line rates are lower). Our 770 Terminal has been as good as our word.

Now we've reduced our prices.

We've been able to lower the price of the 770 from \$6400 to \$4995 for a single terminal. If you order in quantity, we can reduce the price by more than half—to under \$3200.

At the same time, we've reduced your maintenance costs by more than 14%—to \$58 a month, billed annually, for coverage within 100 miles of any of our 100-plus nationwide service locations.

We've also made TI printers available at a price you can afford. You can purchase our built-in 30-cps thermal printer for just \$1100. (With the price reduction on our terminal, that's like getting the printer free.) Or, you can expand your 770's capabilities with our low-cost Model 810 Multicopy Printer.

The one thing we haven't reduced is our features. The 770 supports TPL, a high-level business-oriented language with the industry's leading forms package; dual minicartridge tapes; a



*Model 770
Intelligent Terminal*

1920-character video display; up to 48K bytes of memory; a user-oriented keyboard for both data entry and application software development; a variety of communication modems or interfaces; and TI's total customer service with nationwide maintenance.

If you're ready to reduce your processing workload at our reduced prices, mail in the coupon. Or call your nearest TI sales office or Terminal Systems Marketing, (512) 258-7305.



TEXAS INSTRUMENTS
INCORPORATED

Yes! I am interested in the 770 Intelligent Terminal.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name

Title

Company

Phone

Address

City State Zip

Mail to: Texas Instruments Incorporated
P.O. Box 1444, M/S 784, Houston, Texas 77001

14-5-CW

*Quantity one price, without built-in thermal printer. Prices U.S. domestic only.

Copyright © 1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS.

Wine Sellers' Portable Terminal Cuts Phone Bill

SYRACUSE, N.Y. — When the telephone company did away with unlimited Wats line service here in late 1975, it boosted the monthly telephone bill \$1,000 for Wine Merchants, Ltd. The wine wholesaler had been using the service to receive twice-daily verbal order entries from its 45 field salesmen.

Today, Wine Merchants' sales force is recording order information on portable source data entry terminals and transmitting the data to headquarters in a single call lasting less than two minutes. The same job formerly took 20 minutes to do verbally on the Wats line.

Because of the portable terminals from Azurdata, Inc., the order clerk work force has reportedly been reduced about 75%, and the salesmen have been given more time to sell.

But perhaps most important to Wine Merchants, the accuracy of the order entry has been improved, the shipping process has been streamlined and jealously sought shelf space has been

protected.

"If a store orders an out-of-stock item from us and we don't deliver it the very next day, we could lose shelf space," according to Don Spoerke, DP manager. "It will be filled with other products, and they may not be ours."

Once space is lost, it can be very difficult to regain it, Spoerke feels. And he believes that portable order entry terminals have helped the company keep it.

Before using such terminals, Wine Merchants' New York salesmen were required to call in their order twice daily to a warehouse and sales facility in either Albany, Buffalo or Syracuse, N.Y. There, the information was taped as it was received, manually transcribed and keypunched for use in the computer center located here. Data was transmitted here over telephone lines.

Each call was taped to provide an opportunity to check the order processed with the order placed. Each salesman

would interrupt his sales effort each afternoon to make his first call and would make a second call (with his remaining orders) in the early evening. Each salesman spent an average of 20 minutes on the telephone with such calls each day.

When the telephone company pushed Wine Merchants to search for an alternate sales ordering method, Spoerke said he felt that it could use the opportunity to improve its order entry procedures, and it should have a "real-time system."

"I did not want to say goodbye to that salesman until I was certain that I had every order and the order was perfectly accurate," Spoerke said.

Alternatives Sought

Spoerke believed there was a better way to input data to his NCR Century-based computer operation.

"We first briefly looked into using a Touch-Tone telephone system that worked with an IBM System/7," he recalled. "While we found that we could cut keypunch costs, the savings we sought were not there. Telephone time was not reduced substantially, and the devices were relatively expensive."

Wine Merchants then looked at several portable data entry terminals. Its evaluation found only Azurdata's terminal was compatible with the NCR Ascii system, Spoerke said.

"We determined that we would need a terminal that was Ascii-compatible and with a code structure that would permit its use to transmit directly into our NCR machine," he pointed out.

When the search narrowed to two terminals, a preliminary entry system was established to test the direct entry concept and these terminal devices. "The entry system required the addition of a CRT screen, communications multiplexer and additional memory to the Century system to allow the on-line program to function in a partition in a real-time mode," Spoerke said. "Since software did not exist, we designed and wrote it ourselves."

"Our objective was to accept the input data with our mainframe, validate it, display it and correct it in a minimal amount of time," he added.

According to Spoerke, the terminal evaluation centered on packaging, power consumption and reliability.

The Azurdata terminal packaging was judged superior in weight and configuration. "It fit easily into a salesman's briefcase and was essentially self-contained," he recalled.

Environmental Testing

He said the tests also showed the Azurdata terminal's permanent integral battery used less power and was recharged in less time.

Spoerke made several calls to terminal users to check on device reliability. He was particularly impressed by a major firm that had done extensive environmental testing of both devices before selecting Azurdata.

"It had the capability of doing its own environmental testing. It had put both units through some pretty stringent environmental testing and found Azurdata terminals superior. Because our salesmen faced very harsh weather conditions here in New York State, we were concerned with reliability and felt that Azurdata should also be our choice."

In March 1977, the Azurdata Electronic Notebook Terminal (ENT) was introduced to Wine Merchants' salesmen. Since then, Wine Merchants has added the newer Scorepad terminal for data collection on a branch office basis.

The ENT version is a hand-held, battery-powered data acquisition device with solid-state function and control electronics, solid-state memory and an internal rechargeable battery pack. It has a data entry and function control keyboard, a segmented LED display and a built-in Bell 202-type modem that provides for transmission at 1,200 bit/sec in Ascii.

This terminal provides for keyed entry of product codes of up to seven digits and, on the same line, of five-digit quantity entries. Its standard memory is 4K characters and is optionally expandable to 12K characters.

The Scorepad provides all ENT capabilities with additional flexibility. The solid-state memory is expandable from 8K characters to 88K characters, and the terminal can be configured to read Plessey, Codabar or the Universal Product Code.

The microprocessor design of the scorepad allows selection of field lengths, check digit and transmission of protocols to be made by keyboard entry of an option code.

Wine Merchant's route salesmen now make their calls armed with a portable Azurdata terminal and, as each order is taken, it is keyed into the terminal's memory. At a prescheduled time each evening the salesman calls directly to Syracuse, where a clerk takes the order at a keyboard-equipped CRT that is "live" to the central processor.

The clerk first keys in information necessary to initiate data transmission, including the salesman's location and sales number. The CPU then configures itself to receive the data and the salesman is told verbally to commence transmission.

"As the data is coming across the telephone lines, our software is validat-

(Continued on Page S/29)

INTRODUCING 'MIDAS 78'

MANAGEMENT INFORMATION DATA ACCOUNTING SYSTEM

YOUR KEY TO EFFECTIVE MANAGEMENT AND CONTROL OF DATA ENTRY OPERATIONS

MIDAS 78' is a coordinated plan designed to...

- Help you analyze your data entry operation.
- Institute a flexible management and control system.
- Better control data entry costs.
- Maintain happier, more productive employees.

MIDAS 78' consists of...

- Personalized consulting and analysis.
- A comprehensive software and procedural system.
- Combined payroll, production and management reports.
- A comprehensive incentive program.
- Project and operator scheduling with quality control.

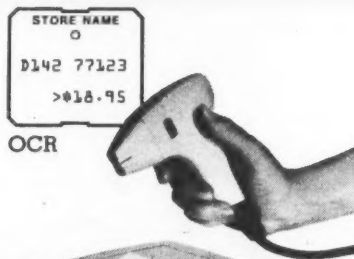
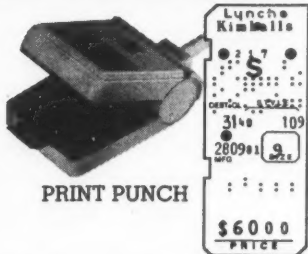
PARAGON SYSTEMS

management consultants

Consulting Services For All Keydisc Facilities
System Programming • Supervisor & Operator Training
Spec Documentation and Revision • Facilities Mgmt.

3050 Metro Drive
Mpls., MN 55420
(612) 854-3272

WHETHER YOU USE BAR CODE, PRINT PUNCH or OCR TICKET READERS, PORTA-VERTER CAN CAPTURE AND TRANSMIT YOUR DATA DIRECTLY TO YOUR COMPUTER.



Porta-verter is a reliable low maintenance electronic gathering device that transmits information via telephone lines to your computer. For full information on how you can capture and transmit sales data faster — and more reliably, give us a call.

DIGITRONICS

Div. of Comtec Information Systems, Inc.
53 John Street, Cumberland, R. I. 02864. Phone: 401-724-8500 TWX 710-387-1171



Network Helps Keep Pace With Hospital's Growth

(Continued from Page S/15)
can be used to call out the same information on demand.

The initial hardware complement in 1973 included 58 CRTs and 14 on-line remote printers, all of which operated from dual central processors having 48K words of main memory each, two strings of five 7.5-million word disk memories each for real-time applications, two disks for batch applications, four magnetic tape units, one 950 line/min printer and two NDC-designed communications controllers.

The main additions that have been made since are 10 more CRTs and 14 more remote printers to handle Lakeland's growth to 640 beds as well as the new departments and facilities. Main memory also has been upgraded to 64K words, and one more disk has been added to each of the two real-time strings.

It's difficult to document much of what was accomplished, because a lot of it had no precedent. What is known is that overall efficiency in ordering, charging patients, billing and so on is most impressive compared with previous practices.

All of the hospital's objectives have been met with an actual reduction of employees in our DP department, admitting and business office. The lab credits the system for its being able to perform a greater volume of tests each year without having to add to its payroll costs.

All of this has been accomplished at a cost of only \$2.43/patient day.

Reaction from staff personnel also has been very favorable, and the sys-

tem has been well accepted by all departments.

Confirming Lakeland's evaluation are comments received in mid-1976 when an independent outside audit by a major health insurance group reported: "Charge accounting, the supporting financial documents and the medical records documentation were the best we have seen in over 25 hospitals. It is an approach that tends to bolster our feelings that medical services can be properly ordered, carried out, charged for and, above all, documented."

Lakeland asserts that the net result is greatly improved patient care.

Barbee is DP manager at Lakeland General Hospital.

OCR Gathers Worker Data

(Continued from Page S/26)

puter cost transfer. EDO engineers use the Model 135 for scientific work, with time charged to a particular contract. An OCR card is prepared with the job number then computer time is captured and applied to the proper contract.

The fourth application is within the Management Information Systems Department, with Schmand's people filling in OCR forms to report work performed. The data is kept on magnetic disk and serves as the basis for billing DP work to the different EDO departments and subsidiaries. It also helps Schmand monitor the progress of new systems development, comparing actual against estimated costs.

The Model 135 includes four 3340 280-M byte disk units and a 1403

1,100 line/min printer. Among the wide range of applications performed are cost accounting, work in progress, purchase order status, specific job controls with progress summaries, weekly status reports by contract, manpower forecasts and contracts pricing or bids.

The latter application is planned for OCR processing. Right now, each operating department prepares its estimate on a contract. The various estimates go to a price estimating group to be summarized and then are key-punched.

Timing is critical on these contract bids, and as the final figures frequently come in late at night, it means holding keypunchers late. With OCR, it is anticipated these overtime costs will be eliminated even as the contract bids are produced faster.

CommFile makes any dummy smart, even intelligent.

You can cut line costs, lower computer time, plus eliminate errors in data entry and editing on your computer terminal.

CommFile converts your free-standing display or printer terminal into a high speed data entry, editing and transmission station.

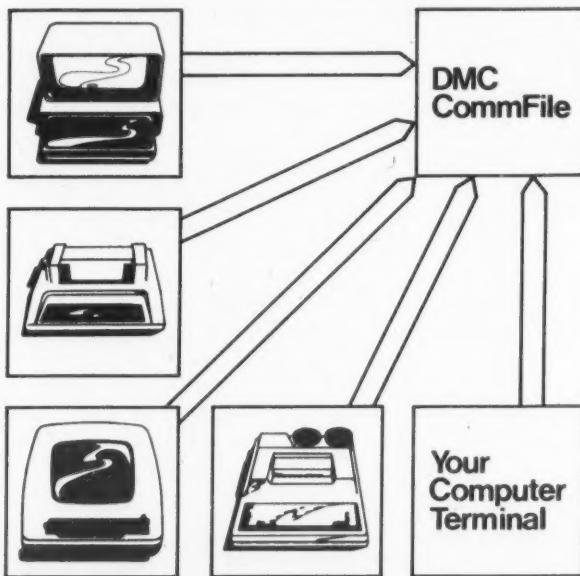
Plug any dumb terminal into the DMC CommFile.

You immediately get a powerful text storage, processing and communication system that is uniquely simple to use.

With CommFile, you can:

- Collect and store text from your terminal or time-sharing system;
- Do comprehensive text editing and file management;
- Communicate these files to your timesharing system.

You can easily expand the basic turnkey system to a complete programmable CPU system with any or all of these features:

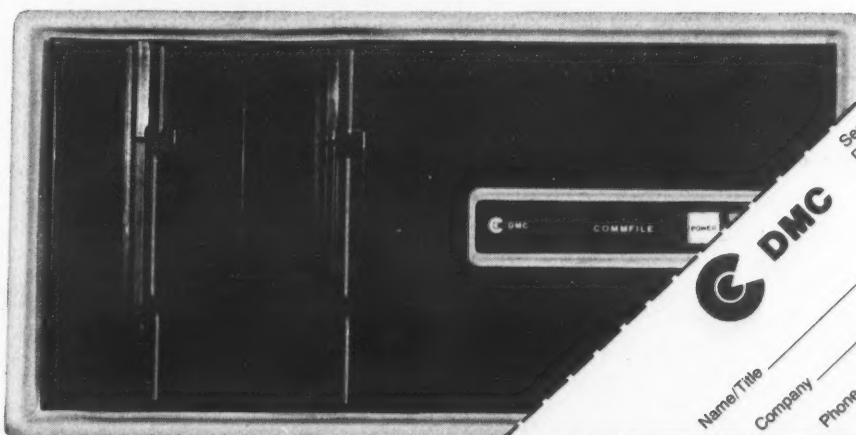


- Up to 60K of memory;
- Up to four floppies;
- Text editor;
- BASIC-Plus;
- Assembly language software;
- Word processing software for complex text formatting.

The CommFile is compatible with almost any data comm system.

Nationwide service (even for terminals you add on) through central dispatch, toll free.

For full information, contact Tom Bowden at DMC.



Send to: Tom Bowden
DMC a Division of Catec Corporation
2300 Owen St., Santa Clara, CA 95051
Phone: (408) 249-1111 Telex 357428

Name/Title _____
Company _____
Phone _____
Address _____
City _____ State _____ Zip _____

Phone Bill Cut By Terminal Use

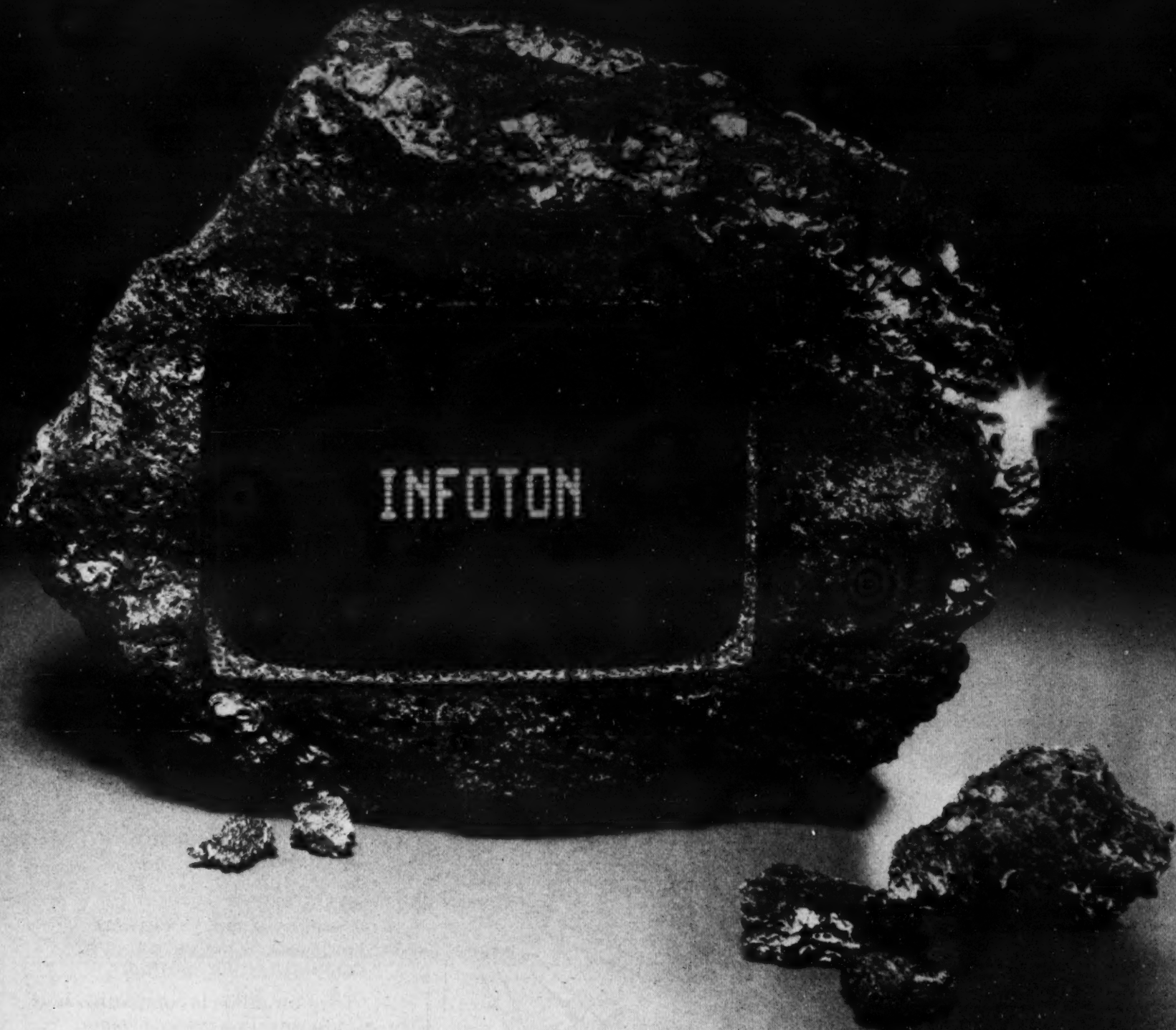
(Continued from Page S/28)
ing the data to see that all products are correct. A customer check is made and a total case count is performed," Spoerke explained.

After the transmission is completed, the computer system performs its final verifications and displays the orders on the CRT screen. One line across the screen is used for each order received. The operator can visually and verbally check the accuracy in several ways and correct errors if necessary.

When this verification is successfully completed, the operator informs the computer and the order data is moved from temporary to permanent disk storage. It is then held while orders are similarly accumulated from other salesmen, and Wine Merchants is ready to begin the billing process.

Spoerke said the order entry process, from the time the phone rings until the CRT operator hangs up the phone, averages about a minute and a half. Where the firm used to employ four 30-hour-a-week keypunch operators as order clerks, it now has one.

The use of the terminals has extended the salesman's effective time in the field because he can make more calls, Spoerke added. The salesman no longer needs to stop in mid-afternoon, locate a phone, prepare a separate order report and read it over the telephone.

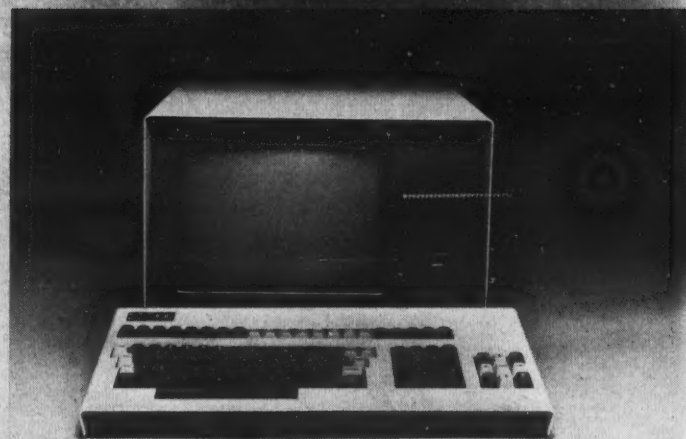


When we promise you impeccable reliability in our Infoton 400 Data Display Terminal, we assume you want our promise cast in stone.

No problem. After all, the Infoton 400 is Z-80 microprocessor based, with editing and formatting capabilities. And at \$1,095 in quantities of 100 or more, it has more flexibility for the price than any other terminal in the business.

As for options, we include two additional pages of memory, a directly addressable printer interface, as well as polling capabilities.

For more hard information about reliability, versatility and pricing call us collect at (800) 225-3337 or 225-3338. Ask for Barbara Worth. Or write Barbara Worth at Infoton, Second Avenue, Burlington, MA 01803.



 **Infoton 400**

Options Now Standard CM Adds 'High-Performance' George

By Jeffrey Beeler
CW Staff

LEBANON, Ohio — Expanded main memory, a reconfigured operating system, quadrupled printer output and other features that were previously available to Cincinnati Milacron, Inc. (CM) customers only on special order are now reportedly standard with a "high-performance" addition to the firm's George family of small business systems.

CM officials credited the enhancements with giving the latest George system, dubbed George HP, 80% to 100% greater throughput than the other five systems that

round out the series.

Standard configurations of the previous family members include a 32K-byte main memory, a 30 line/min printer and a choice of operating systems that offer different combinations of software modules. Users can expand any of these configurations to accommodate a 64K-byte main memory, a 125 line/min printer and an improved operating system — but only for a \$6,000 addition to a system's basic purchase price, according to a spokesman.

With the introduction of the latest George system, however, users can specify all these

features without incurring additional hardware or software costs, he said. "What we have really done is to take what before would have been a very special-order unit, put it together in a standard configuration and then drop the price by nearly \$6,000," he explained.

Besides a 64K-byte semiconductor main memory and a 125 line/min printer, a basic George HP configuration incorporates a CM Model 2200B CPU, two 630K-byte floppy disk drive units (with an option for two additional drives), an optional eight-channel multiplexer and an operating system dubbed SBS Special Configuration 9405.

All the software modules that constitute the operating system were available separately to users before CM announced the George HP. No previous George operating system, however, incorporated modules in exactly the same combination as the 9405 configuration, the spokesman noted.

For example, the system represents the first such CM package to include a printer driver and a sequential file processor, the spokesman said. With all previous George operating systems, those two software modules were disk-resident.

"Our latest operating system is really a high-performance version of its predecessor," he said.

(Continued on Page 52)

Firm Using Two Minicomputers To Seek North Sea Oil Reserves

ASHFORD, England — Two minicomputers, one oceangoing and the other land-based, are allowing a company that conducts underwater geological surveys to help oil companies tap the immense petroleum and natural gas reserves buried deep beneath the floor of the North Sea.

One of the minicomputers controls the navigational system aboard Sonarmarine Ltd.'s survey vessel the Criscilla. The other machine, operating at Sonarmarine's headquarters here, generates topographical maps of the North Sea bottom and its underlying geology.

In this function, the shipboard computer will aid its land-based counterpart while the drydocked Criscilla undergoes an overhaul this winter.

The two systems also help Sonarmarine decide the location of drill rigs and production platforms as well as plan pipeline routes and subsequent inspections for numerous international oil companies.

Officials at the sonar mapping service, a subsidiary of British Petroleum Corp., gave the two minicomputers part of the credit for the firm's ability to expand its staff from 20 to 60 in the year since the organization's founding. They also credited the machines with helping the firm win a highly competitive contract with Statoil, the Norwegian State Oil company, which in September hired Sonarmarine to undertake a major deep water pipeline survey.

No Downtime

In its eight months of operation, the shipboard minicomputer has reportedly experienced no downtime. "Sometimes it was switched on for as long as 14 days, 24 hours a day in all weather conditions," reported Sonarmarine's survey manager W.J.A. Payne.

"For flexibility, we do all our own software in-house, and I can say we have really stretched both these systems," he added.

In the oceangoing system, some of the hardware modules include a 32K-byte SPOC-16/45 processor from General Automation, Inc., twin floppy disk drive units, a 36-in. plotter and a teletypewriter. Operating in real-time, the configuration charts the

(Continued on Page 54)

DG Adds 50M-Byte Disk Drive Featuring 35 Msec Seek Time

WESTBORO, Mass. — Data General Corp. has extended its line of disk pack storage units with the introduction of a 50M-byte drive that reportedly seeks in 35 msec with 8.3 msec latency and a 806,000 byte/sec data transfer rate.

Compatible with the company's two larger disk units, the 6067 series subsystems incorporate four disk packs, cables plus a controller and an adapter for up to four drives, DG officials said.

The Model 6067 attaches to a standard Nova or Eclipse data channel, while the Model 6067-H connects to an Eclipse M/600 through its 10M-byte/sec burst multiplexer channel, the spokesman added. Model 6067-A, meanwhile, is an add-on 50M-byte product.

Users can intermix as many as four 50M-, 96M- or 190M-byte disk storage drives on one controller, or two CPUs can share the units by using DG's Model 6062 dual-port option, they noted.

All three 50M-byte units accommodate DG's Advanced Operating System for Eclipse and Real-Time Operating System for

Eclipses and Novas, according to the company. As a result, the drives support concurrent batch and real-time operation, RJE80 and Hasp II communications software and various programming languages including RPG-II, Ansi 74, Cobol, Algol, PL/I and time-sharing business Basic.

All three products also reportedly operate with the company's interactive Cobol small business systems.

Each drive uses five recording surfaces and 815 cylinders and stores data in 512-byte sectors arranged in 120 sectors per cylinder, DG officials said. They also record 4,040 bit/in. with 370 track/in., the spokesman added.

Measuring 45- by 24- by 34-7/8 in., the 6067 series provides a 7-in. rack-mountable adapter with controllers and dual port options, each of which require two slots in a computer chassis or I/O expansion chassis, DG said.

The Model 6067 costs \$21,800 compared with \$14,800 for the Model 6067 and \$19,800 for the Model 6067-H. The company is at Rt. 9, Westboro, Mass. 01581.

DRS: The real-world data retrieval system.

DRS works for users because it was developed by users. Four simple commands fetch all the data occasional users want; 76 additional commands let sophisticated users probe, pry, massage, and create. And it's very kind to your core: occupying only 80K bytes on a DEC PDP-11; 256K bytes on an IBM 360/370. Small wonder that over 100 organizations large and small use DRS. And love it. Get the details. Call SONCO at 215-667-7670 or use the coupon.

SONCO INC., 146 Montgomery Ave., Bala Cynwyd, PA. 19004
I have a ☐ DEC PDP-11 ☐ IBM 360 ☐ IBM 370
My operating system is _____

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

MINITWORLD

Xylogics Disk Controller Aimed at Users of PDP-11/03

BURLINGTON, Mass.— Users of the Digital Equipment Corp. PDP-11/03 can reportedly access up to 40M bytes of disk storage with a single-board disk controller and subsystem introduced recently by Xylogics, Inc.

When used with 100 track/in. disk drives, the Wizard-1 subsystem becomes hardware-, software- and media-compatible with the DEC RK11/RK05 disk subsystems, according to a spokesman. As a result, the unit allows users to take advantage of all available DEC software without conversions, he explained.

Wizard-1 also reportedly supports all familiar 2.5M-, 5M- and 10M-

byte disk drives in all possible removable and fixed media configurations. Users can attach up to four disk drives to the controller for a total capacity of 40M bytes, the company noted.

Printed Circuit Board

The product comes on a printed circuit board that attaches to any standard Q-bus backplane slot and includes a read-only memory bootstrap loader, on-line test capability and cable to the first disk drive, Xylogics officials said.

Wizard-1 costs \$2,600 from the company at 42 Third Ave., Burlington, Mass. 01803.

'High-Performance' Model Expands CM George Series

(Continued from Page 51)

sors in the George series," according to the CM official, who attributed much of the improvement in the George HP's throughput to operating system enhancements.

More Applications Room

In addition to upgrading the operating system's performance, CM also boosted by about 16K bytes the amount of main memory available for writing applications programs, the spokesman noted.

With the other members of the George series, users could reserve only about 16K bytes as applications space. With the George HP system, however,

almost 32K bytes of main memory are available for that purpose, the spokesman said.

CM has also improved the George HP over other members of the product line by providing a printer stand as standard equipment and by adding a 24-line by 80-character CRT terminal to the configuration, according to the spokesman. All previous George systems came with a CRT terminal that displayed just 12 lines of 80 characters, he noted.

Equipped with an RPG-II capability, the George HP provides a series of optional applications packages for financial jobs like accounts receivable, accounts payable, general ledger and payroll, the official said. The system also comes with a second optional series of software packages that allow users to perform industry-specific tasks like wholesale distribution and contract job costing.

Cycle, Fetch Times

The George HP's central processor cycles in 220 nsec and fetches a byte of data from main storage in an average of 1.1 microsec, CM said. It reportedly provides a 64K by 8-bit semiconductor control storage unit and requires 110 Vac at 60 Hz.

I/O channels in the system include a firmware-controlled direct memory channel and a direct memory access channel that transfers data at up to 96 kbyte/sec, the spokesman reported. In the serial I/O mode, the system is said to operate at 9,600 bit/sec.

With applications software for small retail firms, a standard George HP configuration costs \$19,950. Excluding the applications, the system sells for \$17,100 and is immediately available from CM at Mason Morrow Road, Lebanon, Ohio 45036.

Aviv Controller Fits DEC CPUs

BEDFORD, Mass. — Aviv Corp. has introduced a disk controller compatible with Digital Equipment Corp. operating systems and media as well as with DEC's most recent RK11/RK05F diagnostics, according to an Aviv spokesman.

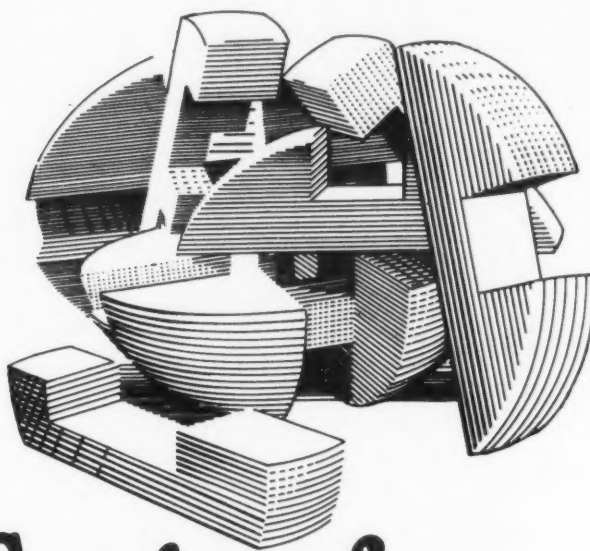
Designed to operate with DEC's PDP-11 Unibus CPUs, the DEC-803 controller reportedly consists of two hex boards and operates with various disk drive models including Diablo Systems, Inc.'s Model 31 and 44, Per-tec Computer Corp.'s 3100 family and Control Data Corp.'s Hawk and Falcon.

IBM Compatibility

Besides storing 2.5M- to 20M-bytes/drive, the unit provides a 16-word data buffer and transfers up to 65K words in one operation, Aviv officials said. It also offers compatibility with either front-loading IBM 2315- or top-loading IBM 5440-type units and accepts 2,400 rpm disk drives, the spokesman added.

Model DFC-803 costs \$3,000, and a complete system with controller, drive and cables is also available from Aviv at 300 Sweetwater Drive, Bedford, Mass. 01730.

Puzzled by Database?



Free DBMS Seminar for Problem Solvers. Don't miss it!

If you're a manager, senior DP person or user who needs to put the database puzzle together, you shouldn't miss our free one-day seminar.

It's all about INQUIRE®, the Problem-Solver's DBMS from Infodata Systems.

We'll show you how easily INQUIRE can put all the pieces—data management; on-line processing; built-in flexible reporting; a true user's language; even

full text retrieval— together into one unpuzzling package!*

*INQUIRE operates in IBM 360/370 (OS, VS, CMS) plus Amdahl and ITEL environments.

INQUIRE DBMS SEMINAR SCHEDULE

New York City May 3, 1978

Los Angeles May 16, 1978

Chicago June 15, 1978

Kansas City June 21, 1978

Reserve now—space is limited. Fill out the coupon and mail immediately, or call us at (703) 578-3430.

Infodata

Infodata Systems Inc.
5205 Leesburg Pike
Falls Church, Virginia 22041



Please register me for the free INQUIRE seminar in:

☐ New York City ☐ Los Angeles
☐ Kansas City ☐ Chicago

Name _____

Title _____

Company _____

Street Address _____

City _____

State _____

Zip _____

Telephone _____

Sorry, I can't attend any of the seminars planned, but I'd be interested in:

☐ Boston ☐ Dallas
☐ Philadelphia ☐ St. Louis
☐ Washington, D.C.

Cost Per Byte Drops DEC Expands Memory Size With Disk Drive Additions

MAYNARD, Mass. — Digital Equipment Corp. has expanded its disk drive line with three units that the company claimed provide greater storage and a lower cost-per-byte than previous DEC products.

Designed to operate with CPUs ranging from microcomputers to medium-scale systems, the drives reportedly include the 5M-byte RL01, which DEC claimed is the lowest priced rigid disk on the minicomputer market, the 28M-byte RK07 drive and the 67M-byte RM02 drive.

Three Additional Drives

Equipped with a 5.2M-byte removable disk cartridge, the RL01 functions with microprocessor-based PDP-11/03s and with all PDP-11s and PDP-8s, a spokesman said. The unit transfers data at 512 kbyte/sec, fits in a 19-in. rack or in DEC's corporate systems cabinets and comes with a universal 110/220 Vac 50-60 Hz power supply, he added.

A subsystem for the drive consists of the drive itself, a cartridge and a controller, which can accommodate up to three additional drives, DEC said.

The RK07, although equipped with a 28M-byte disk cartridge, is functionally identical to DEC's 1M-byte RK06 drive, the company explained. Transferring data at 538 kbyte/sec, it operates with the PDP-11/04, the PDP-11/34 through PDP-11/70 minicomputers and the VAX-11/780 system, DEC said.

Similar to RM03

The RM02, meanwhile, suits PDP-11 systems requiring large data bases and is functionally similar to the RM03 disk drive, which DEC recently announced for PDP-11/70, VAX-11/780 and Decsystem-2020 computers, according to one of the company's spokesmen.

Subsystems for the RK07 and RM02 consist of a disk drive, cartridge and controller, which can accept up to seven additional drives, DEC said.

In addition to its other features, the RL01 reportedly provides an embedded servo with position control information dispersed on each track.

The RL01 costs \$3,800 by itself and \$5,100 as part of a standard subsystem. The RK07 and RM02 costs \$10,500 and \$18,000, respectively, as individual modules, and \$14,500 and \$23,000 in subsystems. Deliveries of all three drive models will begin by late April from the company at 146 Main St., Maynard, Mass. 01754.

Unit Logs Without Controller

PALO ALTO, Calif. — The ability to both log data without a controller and to boost the storage capacity of systems that do need such a unit is now said to be available with a tape cartridge mass memory product announced here recently by Hewlett-Packard Co.

Available in single- and dual-drive configurations, the Model 9875 also transports data between HP desktop computers, according to a spokesman.

Both configurations provide data interchange and acquisition capabilities, and a built-in microprocessor makes possible a set of 23 commands, he said.

An IEEE 488-1975 interface bus allows the 9875 to store data in any

HP 9800 series desktop computer and later read that data into any other CPU model in the series, the spokesman noted. The unit, which comes with tapes that hold as much as 225K bytes, stores data in HP's Standard Interchange Format.

A "listen-only" mode reportedly allows the 9875 to perform some data acquisition operations independently of an external controller. In the "programmable listen-only" mode, the product reads and executes tape commands.

The single- and dual-drive units cost \$2,600 and \$3,100, respectively. Optional HP desktop computer interfacing is available, HP said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

**we know
computers
and we know
leasing...**

Over \$600,000,000 worth of computer equipment presently on lease makes General Electric Credit Corporation the industry's leading leasing source and gives it the know-how required to stay in front. This experience can work to get you the computer mainframes, peripheral equipment and distributed data processing systems you need, regardless of how complex the transaction may be.

Whether it's a multi-million-dollar leveraged lease for a large scale system or a single investor lease for a small accounting installation, GECC has the ability and the people with the expertise to provide you with the best leasing alternatives. And because we have the resources, we'll be there when you want to upgrade or add-on to your GECC-leased system.

Put our resources and expertise to work for you.

Complete the coupon or, better yet, call the local GECC office nearest you and experience our fast service.



Administrative Offices:
Stamford, CT 06904 • (203) 357-4597

3 days. EDP project management

A comprehensive seminar that will show you how to get new EDP projects up and running as quickly as possible, while holding down development costs at the same time. Provides the comprehensive set of guidelines you need to harness the resources required for successful completion of a project.

Enroll now for:

- San Francisco: May 15-17
- Washington: May 31-June 2
- New York: June 12-14
- Los Angeles: June 26-28
- Chicago: July 12-14

for
FREE COURSE OUTLINE
and full schedule of EDP seminars, call

800-257-9406

datapro

1805 Underwood Blvd., Delran, NJ 08075
In N.J. call 609-764-0100

To: Mr. James E. Kelly, Advertising Mgr.,
(Equipment Leasing)
General Electric Credit Corporation
P.O. Box 8300, Stamford, CT 06904 • (203) 357-4903

Dear Mr. Kelly: I would like more information about
GECC's customized financing and leasing plans.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Telephone _____

Zip _____

ATLANTA (404) 451-5921, BOSTON (617) 272-8540, CHICAGO (312) 858-8650,
CLEVELAND (216) 842-6333, COLUMBIA (301) 997-4990, COLUMBUS (614) 891-7750,
DALLAS (214) 234-0648, DENVER (303) 320-3660, DETROIT (313) 356-1910,
HOUSTON (713) 661-7106, KANSAS CITY (913) 384-1080, LOS ANGELES (213) 572-5317,
MEMPHIS (901) 365-2457, MINNEAPOLIS (612) 835-5100 Ext. 216,
NEW YORK (203) 255-5911, OKLAHOMA CITY (405) 947-3300, PHILADELPHIA (609) 779-9011,
PITTSBURGH (412) 923-2520, SAN FRANCISCO (415) 327-0110, SEATTLE (206) 575-2990.

Dual-Density System Fits Univac V77

BLUE BELL, Pa. — Univac has introduced a dual-density magnetic tape system that operates at 75 in./sec and records data at 800- and 1,600 bit/in.

Designed for use with the company's V77 line of minicomputers, the Model 70-7104 consists of a microprogrammed controller and an IBM-compatible vacuum column tape drive, a Univac spokesman said. The 9-track system also comes with optional slave magnetic tape units for system expansion, he added.

At 1,600 bit/in., the system operates in the phase-encoded format and transfers 16-bit words between magnetic tape and the CPU at 60,000 word/sec, Univac said. An error correction feature reportedly corrects single-track dropouts automatically during phase-encoded reading opera-

tions.

At 800 bit/in., the system operates in the NRZI format and transfers data at 30,000 word/sec, Univac said.

System Applications

Designed for I/O operations using Vortex, Univac's real-time multitasking operating system, the 70-7104 rewinds at 200 in./sec and starts/stops in 5.3 msec, the firm explained. Other applications for the tape system include data processing for large mainframes, backup storage for disk memories and binary output for V77 programming languages like Fortran IV, RPG-II, Cobol, Basic and Macroassembler, the spokesman said.

During reading operations, the unit reads data as an 8-bit byte plus parity bit, Univac said. The controller report-

edly checks parity for each byte and arranges sequential byte pairs into 16-bit data words.

During writing operations, the system transfers 16-bit words to the controller under binary interface control, the spokesman said. The controller then splits each word into two bytes, generates odd parity bits and transfers the bytes and parity bits to the tape unit.

Standard features with the system include automatic tape loading and input power of 115 Vac at 60 Hz, with optional power source of 230 Vac at 50 Hz available, Univac said.

The master unit costs \$14,900 compared with \$10,700 for the slave unit. Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19422.

Add-On Swells PDP Memory

MINNEAPOLIS — A semiconductor add-on memory from Fabri-Tek, Inc. reportedly contains 32K by 18 bits of dynamic MOS memory on one card, which plugs into a Digital Equipment Corp. PDP-11 hex height card slot.

Designed to operate with PDP-11/04 and -11/34 minicomputers, the Add-In-11 allows users to expand their memories in 32K-word increments up to the maximum capacities of their computers, Fabri-Tek officials said. The unit provides its own on-board parity generation and checking circuits plus a control status register, which holds any detected parity error.

An Add-In-11 with 12-month warranty costs \$2,450 from Fabri-Tek at 5901 S. City Road 18, Minneapolis, Minn. 55436.

We wrote the book on distributed networks.

With more than 250 networks installed and running, including several in our own plants, Hewlett-Packard knows a lot about dedicating computers to production tasks and tying them together into information systems.

Our DS/1000 software, which took 30 man-years to develop, is designed to make running your factory's production and operations management tasks much more efficient. It lets you set up economical links between our powerful HP 1000 real-time computers.

With the HP approach, you can cut overall costs by sharing peripherals. For example, any computer in the network can use any printer. You can also maintain control by writing all the programs on one HP 1000, then downloading them to the computers doing the work. And if one system is down, you can transfer jobs to one that isn't.

You can also write programs to access and update data files on remote HP 1000s, using the same program requests as you would for your local computer. So if you want to know some test results that took place on another system, you'll get up-to-the-minute numbers instead of yesterday's out-of-date news.

When you request this remote data, the system's

store and forward communications pass the information from node to node quite transparently. (It's this feature that cuts the cost of putting together a large network and lets you add nodes without rewriting your application software.)

The next important step is linking the HP 1000 network with our HP 3000 general purpose computer. This gives you access to high-level business languages. And you can transmit information from factory to front office for top management review, for updating cost accounting and inventory control, and for summaries requiring batch processing.

Now you can see the movie.

Obviously, there's a great deal more to our distributed networks than we can tell you here. So we'd like to show you our new 20-minute movie that tells it all. Just send us the coupon and we'll arrange a private showing that could be a real revelation.



Yes, I'm interested in seeing the HP 1000 distributed systems network movie.

- ☐ Get in touch to arrange a showing of your movie.
☐ Send me printed information only.

Name _____ Title _____

Company _____ Phone _____

Address _____

City/State/Zip _____

Mail to: Hewlett-Packard, Attn: Larry Turner,
11000 Wolfe Road, Dept. 322, Cupertino CA 95014

HEWLETT  PACKARD

Minis Seeking North Sea Oil

(Continued from Page 51)

Criscilla's course by sampling two navigational systems and an echo sounder, checking and filtering the accumulated data and the logging it onto a 9-track, 800 bit/in. magnetic tape unit.

In this way, the system computes and plots the vessel's position every 10 seconds. It also generates periodic pulses to mark the echo sounder and any other geophysical equipment operated by the ship's crew, Payne explained.

From the resulting information, the system can produce a record operators can use later to correlate the vessel's position in relation to the geophysical equipment sites, he added.

A CRT terminal with a 21-in. screen operates on the ship's bridge primarily for the benefit of the helmsman. When an operator enters the start and end coordinates of a required survey line into the computer, the CRT displays the ship's position relative to this "sail" line.

The CRT then presents this information in the form of arrows on either side of the desired central line. The system also uses the terminal to display historical data such as the vessel's previous position, Payne said.

After being checked and correlated, the data collected at sea goes to Sonarmarine's land-based minicomputer, a 64K-byte GA SPC-16/440, which uses the input to mechanically generate the main outline of each surveyed area, navigational plots, charts showing selected ocean depths and other geophysical information. If necessary, draftsmen can manually add further information to these charts before they go to a waiting client.

Controlled by eight map-drawing programs developed by Sonarmarine officials, the land-based system incorporates a 10M-byte disk drive unit, a 9-track, 800 bit/in. magnetic tape unit, a 326-in. drum printer, a 600-line/min printer, teletypewriter, 285 card/min card reader, paper-tape reader and two CRT terminals.

Company officials eventually plan to expand the original configuration to include two additional CRT terminals and an 80M-byte disk unit. With this additional hardware, the land-based system will oversee Sonarmarine's accounts and possibly its stock control.

THE "WAVES" IS HERE!

Charles P. Lecht's new book, *The Waves of Change*, is off the press and ready for shipment. It incorporates the serialized excerpts that appeared in *Computerworld* between April and October, 1977, with significant updating and revision, brand new material not previously published, and a host of informative illustrations.

The Waves of Change presents a global view of the data processing industry, assessing the technological and economic currents by which it has been, is, and (in the author's extensively documented opinion) will be directed in future.

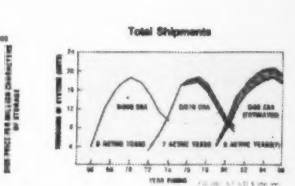
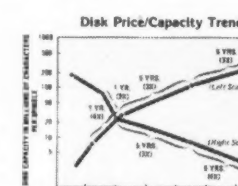
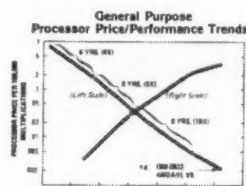
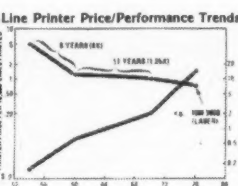
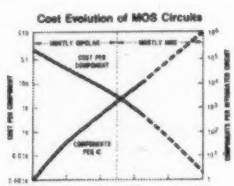
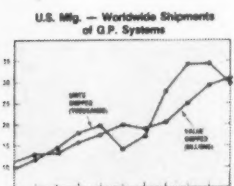
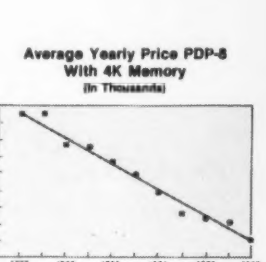
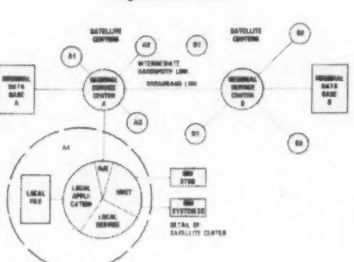
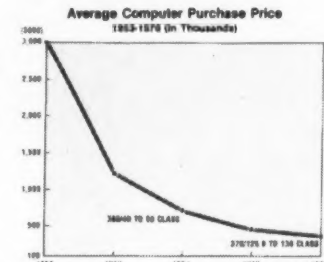
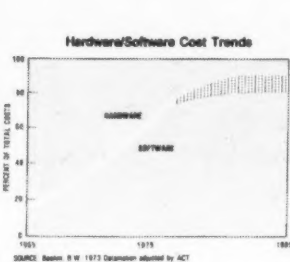
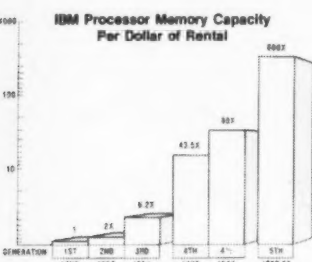
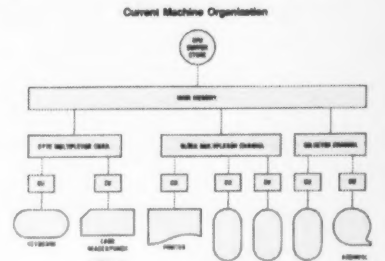
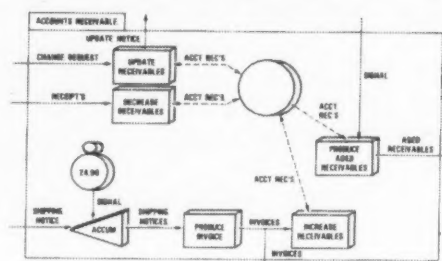
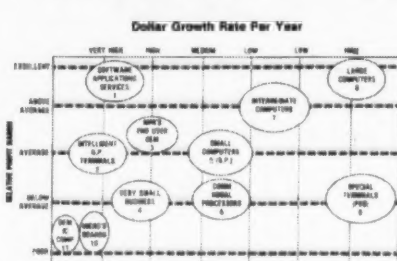
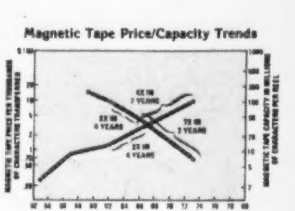
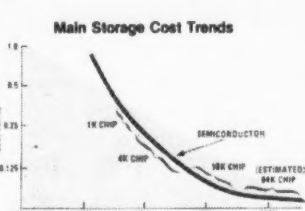
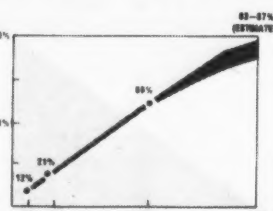
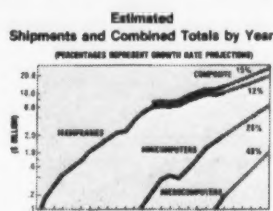
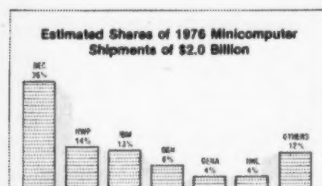
Furthermore, it accounts for the impact

on developments in the DP field of the psychology of both users and vendors. Patterns of thought and perception, and the ways in which such patterns manifest themselves through judgments affecting the direction taken by technology and product planning strategies, are certainly at least as vital to our understanding of the state of the DP art as are the purely "technical" breakthroughs themselves.

The Waves of Change addresses developments in the hardware and software realms—both single events and "trends"—at length. It explores the competitive positions of manufacturers, the middle- and

long-term impact of the burgeoning mini/micro families, the problems faced by corporate management in assessing the role of hardware/software usage methodologies (and the value of specific systems) as these apply to their particular needs, and many other subjects of intense interest to all who are affected by DP.

The Waves of Change is a series of wide-ranging essays united by a dual sense of purpose: to assist the reader in evaluating where we are (and why); and to provoke him to consider the implications of rapid change upon his ability to adapt and survive.



ABOUT THE AUTHOR



Charles Philip Lecht is founder, President and Chairman of the Board of Advanced Computer Techniques Corp. (ACT), a computer software and consulting firm. Lecht holds a B.S. in mathematics from Seattle University and an M.S., also in

mathematics, from Purdue. His involvement in the computer field extends back to 1951, making him an "old-timer" in a very young industry. He founded ACT in 1962. Since then the company has grown from a one-man show to an international complex employing some 400 persons.

Lecht is a noted speaker and author whose books, in addition to *The Waves of Change*, include three on computer languages and one on project management.

Lecht is a member of the **Young Presidents Organization**, **The Hudson Institute**, the **DPMA**, the **ACM** and the **New York Academy of Sciences**. Profiles of him have appeared in the *New Yorker* and *Datamation*. Recently, he has been asked by the CBEMA to argue its case against the proposed I/O interface standard before the Brooks Subcommittee of the U.S. House of Representatives.

Clip and mail c/o C. Menkel to:

ADVANCED COMPUTER TECHNIQUES CORPORATION PUBLICATIONS DIVISION
437 Madison Ave., New York, N.Y. 10022

Please send me _____ copies of C.P. Lecht's *The Waves of Change* at U.S.\$39.75 per copy. Prepaid orders will be filled on a preferential basis as received.

Name _____

Title _____

Co. Name _____

Shipping Address _____

Zip _____

Payment enclosed ☐

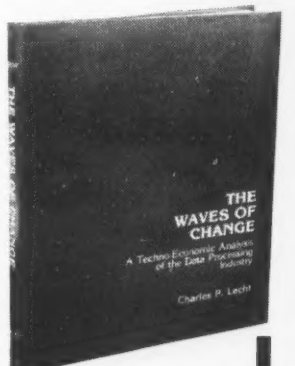
Bill me ☐

*Ship First Class Air Mail ☐
(US/Canada only; see below)

Payment is in U.S. dollars ONLY. Checks should be made out to ACT. N.Y. State orders, add 4% (\$1.59) tax; N.Y. City orders, add 8% (\$3.18) tax.

The basic per-copy price of \$39.75 covers domestic book rate postage and handling on orders to be shipped within the U.S. and Canada. All other orders: add U.S.\$4.46 per copy for First Class Surface Mail, unless regular surface service is preferred.

*U.S./Canada orders ONLY: if First Class Air Mail shipment is desired, please specify in the space provided on the coupon. The cost of this service is U.S.\$2.78 per copy.



System/34 Users Surveyed

SAN JOSE, Calif. — System/34 users view adequacy of disk storage and program/data conversion as their chief systems concerns, according to a recent SBS Publishing, Inc. survey of almost 200 buyers of the IBM equipment.

SBS found that more than 27% of the 70 users responding had decided to switch to a System/34 after only three months of deliberation. The study, entitled "IBM System/34 — User Analysis," also showed that nearly half of the respondents (44.4%) considered no other hardware vendors but IBM.

Manufacturers proved to be the most likely user class to acquire an IBM canned software package, even though almost 85% of the respon-

dents said they preferred to control their own software development, SBS Publishing found.

To form a picture of overall product trends, the survey also analyzed migration paths from the System/3 and System/32 and found that most System/34 users expressed satisfaction with their System/3s or System/32s.

In other findings, the publisher noted that some IBM followers would order almost any IBM product IBM announced and evaluate it later.

The survey costs \$125 and is available immediately from SBS Publishing at 4320 Stevens Creek Blvd., Suite 190, San Jose, Calif. 95129.

Array Processor From DG Boasts 'Very High Speeds'

WESTBORO, Mass. — Data General Corp. has introduced an array processor the firm claims allows users to perform signal processing and transform processing at "very high speeds."

The AP/130, which DG claims is the first array processor offered by a mini-computer manufacturer, computes the fast Fourier transform of a 1,024-element complex number array 200 times faster than a scientific mini-computer, the company said. It also adds and subtracts ordered pairs of 32-pair floating-point numbers every 200 nsec and at the same time multiplies another pair of 32-bit floating-point operands every 400 nsec, company officials added.

Applications for the array processor reportedly include acoustic and radar signal processing, tomography, spectroscopy, seismic data processing, vibration analysis, speech analysis and processing, communications and generalized matrix computation.

A typical AP/130 hardware configuration consists of a 192K-byte Eclipse S/130, an array processor with 8K-byte bipolar memory, an S/130 floating-point instruction set or an optional character instruction set and standard DG peripherals, including a DG/DAC sensor I/O subsystem, which supports I/O configurations with more than 1,000 control and measurement points.

The array processor extends the S/130's instruction set with 46 high-level instructions and 110 operations on 32-bit floating point data, DG explained.

AP/130 hardware is supported by DG's Array Processor Software (APS), which users can access from two high-level languages, Fortran 5 and DG/L, the company said.

A typical entry-level AP/130 system for laboratory use consists of a 128K-byte CPU, real-time clock, 30 char./sec Dasher TP1 printer, 10M-byte cartridge disk subsystem, dual diskette units, Rdos, Fortran 5 and APS, a company spokesman explained. In the U.S., this configuration costs \$60,000 with quantity and OEM discounts available.

DG is located at Rte. 9, Westboro, Mass. 01581.

ATTN: 3270 USERS

Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. **Systems Programmers**, in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

PLUS

Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turn-around time is reduced to minutes.

PLUS

Address Switching. Any BRAEGEN CRT terminal provides as many addresses as required for Console, TSO, Applications, etc. Any CRT can have both Local and Remote addresses. This feature can reduce the number of CRT's required and will eliminate NCP,

VTAM type software overhead requirements.

PLUS

Multiple Controller Interfaces. The BRAEGEN controller allows multiple channel and remote interfaces. Any CRT can access multiple local IBM CPU's or remote CPU's. Just 2-3 seconds to switch a CRT between CPU's or addresses.

PLUS

Fast Cursor, Programmable Keyboard, 7500' Coax,

Multiple Drops per Coax, Wide range of speeds in 3286/3288 compatible printers; from 45 cps to 1200 LPM, Offline Data Entry, and our Offline TSO Editor.

PLUS

Features others have promised for 1978-1979 are **AVAILABLE NOW . . .** Local Copy, 128 character set CRT, Typamatic keys, Home key, etc.

PLUS

Low Prices — 1, 2, 3 year leases available.



Customers throughout the U.S. are benefiting from these features now. For more information please write or call; The BRAEGEN Corporation, 20740 Valley Green Drive, Cupertino, California 95014. (408) 255-4200.



BRAEGEN

MDB Interface Links PDP-11s

ORANGE, Calif. — A general-purpose interface introduced here by MDB Systems, Inc. allows users to transfer 16-bit data bidirectionally between two Digital Equipment Corp. PDP-11s or between a PDP-11 and a peripheral, according to the firm.

Model TA-528 reportedly comes with integral line drivers and receivers as well as with interrupt request and control logic, address selection, I/O buffer registers and a control/status register.

By linking two of the modules, users can permit a pair of PDP-11s to exchange data as far as 100 ft.

Model TA-528 costs \$615 from MDB at 1995 N. Batavia St., Orange, Calif. 92665.

**On-line
key entry
for
CICS users!**

See page 8 in the Special Report section for details.

Take your choice: on-line or off-line.



3 dry, convenient, laser printers, from Kodak.

For the detailed story, write Eastman Kodak Company,
Business Systems Markets Div., Dept. DP8592, Rochester, NY 14650.

KODAK KOMSTAR Microimage Processors



Supermarket Mini Gets 25% Off Utility Bills

By Ann Dooley
CW Staff

NEW YORK — Shopwell Supermarkets, Inc. is cutting its utility bills and regulating refrigerator use with a minicomputer-based energy management system installed in its greater metropolitan area stores here, according to Jeff Victor, director of energy conservation.

Called the Supermarket Energy Management Program, the system is currently being tested in five of Shopwell's stores with good results, Victor said.

The system, which has cut utility bills by 25% in at least two stores, was developed in cooperation with IBM, he added.

The system runs on an IBM Series/1 minicomputer with 16K memory, an IBM 4953/A processor, a Model 4964 diskette unit and 32 digital input and output points. No preprogramming is required, so the system can be used in any store, Victor noted.

"Unlike office buildings, schools or

factories, we have highly perishable products and correct temperatures must be maintained to protect them," vice-president Glen Rosengarten pointed out.

"But while refrigeration units keep the foods fresh, they also use between 42% and 48% of all the energy consumed in supermarkets. That's why the key to this program is the refrigeration compressor," he noted.

Control for 30 Processors

The system is programmed to increase refrigeration compressor efficiency by automatically maintaining product temperatures under changing conditions. It can control up to 30 compressors, each with a number of refrigeration compartments attached.

The energy system was designed to adjust the temperature by turning equipment off or on according to the rate of temperature change in each food compartments, Victor explained. Although the refrigeration compressors have their own regulating moni-

tors, Shopwell wanted extra protection for the compressors to prevent them from running colder than necessary and wasting energy or warmer than necessary and running the risk of spoiling food.

The system is also programmed to alert store personnel to harmful conditions in the food cases, Rosengarten said. For example, if the temperature in a food case stayed too high, the Series/1 would alert the store manager to check the case to see if any equipment such as a compressor, thermostat or defroster is not working properly.

Rosengarten noted that the size of a store isn't as important for system operation as the number of devices to be controlled. The system has been just as successful in a 15,000 sq-ft store as in a 33,500 sq-ft store, he said.

The system can reduce the energy consumption of any supermarket mechanical device, according to Rosengarten, but stores should have at least a \$3,500 monthly utility bill to make the system cost-effective.

Several years ago, Shopwell executives decided they needed a more aggressive energy management program, Rosengarten recalled. After looking at a number of energy saving programs, Shopwell chose the Series/1.

In addition to the automated system, Shopwell added insulation, sealed off unnecessary doors, reduced lighting wattage and fine-tuned all equipment, Victor said. Customers are not affected by any of these implementations. "The system simply makes for efficient use, not abuse of energy," he said.

Shopwell is planning to equip the system with extra energy saving such as a preventive maintenance program that will notify a store manager if equipment is about to break down. This function can be performed by monitoring equipment conditions to determine if the machinery is operating at top efficiency, Victor explained.

The system also has a fail-safe device so if it ever goes down, each compressor will immediately release control of all the machinery it had turned off.

Computer Professionals

The Custom and Special Products Organization is a small, unique group with a strong entrepreneurial flavor that can offer professionals at every level an uncommon amount of participation, variety, exposure, and growth. Because we're engaged in new product development to meet specialized customer requirements, you can be involved from customer contact through delivery in a wide range of projects at the leading edge of real-world needs. And because of our group's interactive nature, you'll have the opportunity to rapidly expand your expertise into other areas, both technical and business, depending upon your background and interest.

Right now, we're actively seeking project-oriented professionals who will recognize the opportunities our environment offers . . . and who have the ability to contribute to our continuing success.

If you are a computer professional who is seeking to make immediate significant contributions in a highly visible environment that will accelerate your career not only within the Custom and Special Products Organization but will also open up opportunities in other areas of Honeywell . . . we would like to hear from you.

Software Engineers

Opportunities are available at all levels of experience for software engineers to contribute to our distributed data processing and networking programs. While direct experience would be very helpful, we can offer talented professionals with communications software experience an opportunity to develop their abilities in distributed data processing and networking. You will work directly with customers and our marketing organization with involvement in complete systems including software, firmware, and hardware. Ideally, you will have a knowledge of 360 and 370 software systems and assembly level software experience. Positions are also available for software support engineers who can handle the tough debugging problems.

Interested applicants for the above positions should send their resume, complete with salary history and indicating position or positions of interest to Mr. Jerry Haynesworth, HONEYWELL S/MISD, 300 Concord Road, Billerica, Massachusetts 01821. An Equal Opportunity Employer M/F

Hardware Engineers

We're seeking skilled hardware design/development engineers with minicomputer, communications, or intelligent terminal design experience. Firmware or microprocessor design applications development is very desirable. Qualified candidates will have the opportunity to work on proposals for customers, or on design projects from conception through delivery. These positions offer an excellent opportunity to gain expertise in firmware and software as well as attractive growth potential.

Senior Consultants

This is a unique opportunity for accomplished Systems Engineering-oriented professionals to be at the forefront of network design and augment your computer expertise with business involvement.

You'll be joining a marketing/systems engineering organization that provides high-level technical support for the marketing of customized systems and special products and generates all proposals for Honeywell's Minicomputer and Terminals Operations. In addition to the above responsibilities, you will be involved in the conceptual design of custom systems with emphasis on systems software.

To meet these wide-ranging responsibilities, we're seeking professionals with 10-15 years experience and who, ideally, are recognized as an expert in their areas. Your technical background should be systems-oriented with particular knowledge of IBM. Communication or data base expertise is also desired. You also must have a sound awareness of markets and competitive situations and effective communication skills are critical.

If you fill these qualifications, we can offer you an outstanding environment to gain high-level exposure to a broad range of areas, and an excellent career path to even greater responsibilities within Honeywell S/MISD.

**Here's
a group
you will
think is
too good
to be
true!**

**THE
SEARCH
IS ON**

Honeywell



Digital introduces Datatrieve. Now anyone can get data from a PDP-11.

Anyone with a PDP-11 and an RMS-11K record management system can now achieve a new order of data accessibility. Digital's brand new query language and report generation software is here. It's called Datatrieve, and with it you could make just about anyone

time of your programmers.

It's designed for file clerks, plant workers, secretaries and even the company president. That's why Datatrieve-11 is a distributed processing tool of real importance. And its features, including interactive file update, security control and report format flexibility, make it ideal for a broad range of applications from the warehouse to the boardroom.

Available now. With a liberal supply of "I'm a Datatriever"

**I'M A
DATATRIEVER**

buttons for all those people in your company who will no longer be cut off from your computer by a language barrier. Write for full details. Digital Equipment Corporation, Commercial Products Group, MK2N38, Merrimack, N.H. 03054.

European headquarters:

12, av. des Morgines,
1213 Petit-Lancy/Geneva.

In Canada: Digital Equipment of Canada, Ltd.

digital

Datatrieve-11.

Everything about it is easy to work with.

- Handles sequential, relative and multi-key ISAM and (RMS) files in COBOL, BASIC PLUS-2, DIBOL, RPGII, and MACRO.
- Interfaces with RMS-11 on major Digital operating systems including CTS-500, RSTS/E, RSX-11M, and IAS and uses COBOL-compatible record definitions. Reduces programming time consumed by traditional ad hoc reporting.
- Offers built-in file update and file security features.
- Gives user extensive control of report formats.

in your company a "Datatriever" practically overnight.

The key to Datatrieve is an instruction set that's literally as simple as "Help, ready, find, sort, select, print, modify, store, erase, report." Using these basic Datatrieve commands, virtually anyone can access data and generate reports without using the valuable

Digital Equipment Corporation, Commercial Products Group, MK2N38, Merrimack, N.H. 03054. CW4248

Yes, I'd like to help our people become Datatrievers. Please send me the facts about Datatrieve-11.

☐ Please ask your salesperson to call. ☐ Please send product information.

Name

Title

Company

Address

City State Zip



Mark your calendar now! Be there when the computer industry's most dynamic show comes near you!

The Computer Caravan's



You're invited to see the latest and the best in:

Data Communications Terminals • Software • Minicomputers
• Data Input Equipment • Computer Output Equipment
• Supplies • Magnetic Media • Modems • DP Education
• Small Business Computer Systems • Flexible Disk Drives
• Data Communications Interconnect Equipment • Mini-peripherals • Magnetic Tape Transports • Cassette Systems
• Power Supplies • Printer Terminals • Keyboards. And more.

Here are the companies who will be looking for you:

NCR
Varian Graphics
Informatics
Honeywell
Datamation
Communication News
McCormack & Dodge
Data Rentals
Computer Sales International
Intel
Electronic Ventures
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing
S.E.A.
Tri-Data
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems
Shasta
Mostek
DIVA
SBC Magazine
Tele-dynamics
Control Data

National Semiconductor
Printronic
Codex
Lear Siegler
E M & M
The Morley Company
Vanier Graphics
Total Typography
Wang Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Infotex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Informer
Computer Decisions
Infosystems
T-Bar
Corporate Systems
YE Data
Arcus
St. Louis Info

Computerworld
NCI
AT&T
Kodak
BASF
IBM
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service
Ite Corporation
Deltak
Peripheral Products
General DataComm Industries
Continental Peripherals
Computer Associates
Qantel
Diablo Systems
Marketechs
Racal-Milgo

Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
McGinn Safe
Allstate Computer
H/G Professional Forms
Nichols & Company
Datapro
Input Services
Plessey Services
Industrial Computer Controls
Vincent Data Products
World Info Systems
DP Power
Conrac
Educational Data Systems
Cybertek
Cosmic
Business Automation
Insyte Datacomm
Herrera Kirby
Foto-fun
Hamilton Sorter

Trac Associates
Sperry Univac
Xerox
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp.
Programs, Inc.
Beehive International
Interlec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tandem Computer
PCC/Pertec
Computrend
Extel
Mentel
Sycor
Digitronics
Computer Services
Datamart
Courier Terminals
Modems Plus
Software Design
Curtis 1000

Spectron
K&K Associates
Applied Digital Data
Epic Data
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rianda Electronics
Computer Corp of America
Cullinane
Hewlett Packard
Pansophic Systems
Dynatech
Western Union
Calcomp
General Computer
Atlantic Research
Telefile Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments
Consolidated Computer
Cybersearch



Here's the schedule:

ST. LOUIS
Gateway Computer Expo
CHICAGO
Midwestern Computer Expo
NEW YORK
Mid-Atlantic Computer Expo
DETROIT
Great Lakes Computer Expo
BOSTON
New England Computer Expo

April 25, 26, 27
Gateway Convention Center
May 2, 3, 4
McCormick Place
May 9, 10, 11
New York Coliseum
May 23, 24, 25
Cobo Hall
May 30, 31, June 1
Northeast Trade Center

Show hours:
10AM to 5PM

No advance registration required. An exhibitor guest ticket or your business card will admit you.

THE COMPUTER CARAVAN'S



The Computer Expo is produced by the Caravan Division of the Conference Company, 60 Austin St., Newton, MA 02160. (617) 964-4550.

A Rather Foolish Situation

By Frank Vaughan
CW Staff

The prime season for microcomputing shows has begun, and the calendar is booked with exhibits through the summer and fall. However, before any micro fans make any definite travel plans, it might be wise to keep an eye on Chicago, where two shows are scheduled for consecutive weekends in October — a somewhat foolish situation.

Users encountered a similar situation last year, when micro shows were held in New York and Chicago on the same weekend. The conflict hurt both the shows and exhibitors and deprived users

of the chance to attend both events.

The same thing is bound to happen this year. After all, what user — or exhibitor — can afford to travel to the same place two weekends in a row?

The blame for this situation lands

Analysis

squarely on the shoulders of past and present employees of Benwill Publishers, Inc. Benwill sponsored the show in Chicago last year; after that unsuccessful event, the Benwill organization and some

of its employees parted ways. Both groups then claimed the "rights" to the Chicago show.

So, again, both the hobbyist and exhibitor find themselves in the same leaky boat, faced with a conflict of such magnitude that it threatens to do serious damage to personal computing in the Chicago area.

The fact of the matter is that the exhibitors are caught between the rock and the hard place since exhibiting in both shows, with twice the expense, borders on fiscal irresponsibility. At the same time, skipping one of the shows and exhibiting at

(Continued on Page 62)

Olivetti Ties Together Micro, Calculator

NEW YORK — Olivetti Corp. has introduced a user-programmable microcomputer/calculator combination for DP novices that reportedly features a self-contained 2.5-in. disk, 16-column alphanumeric printer and a 16-character LED display.

The Olivetti P6040, which the firm called a "personal minicomputer," was designed for students, loan officers and engineers.

The 8080-based unit prepares, executes and debugs programs, performs diagnostic checks on syntax and logic errors and monitors the workings of its own components, a spokesman claimed.

The read/record unit uses Olivetti's 2.5-in. Mylar "minidisk" that has 3K bytes of user space. It can interface peripherals with either parallel or RS-232C serial interfaces, the spokesman said.

The P6040's standard operating system can handle the logic required for the addition of variety of printing, plotting and instrumen-

tation peripherals, the firm claimed.

The P6040's Mini Basic language is utilized through seven key programming verbs located on the keyboard. The system provides 26 user-defined function keys.

Applications available for the unit include mathematical and statistical programs; calculation of student aid eligibility; auto financing calculations; installment and commercial loans; and IRA and Keogh plans.

Olivetti said it provides user training and support for the P6040, which costs \$2,300. The vendor is at 500 Park Ave., New York, N.Y. 10022.



Olivetti P6040

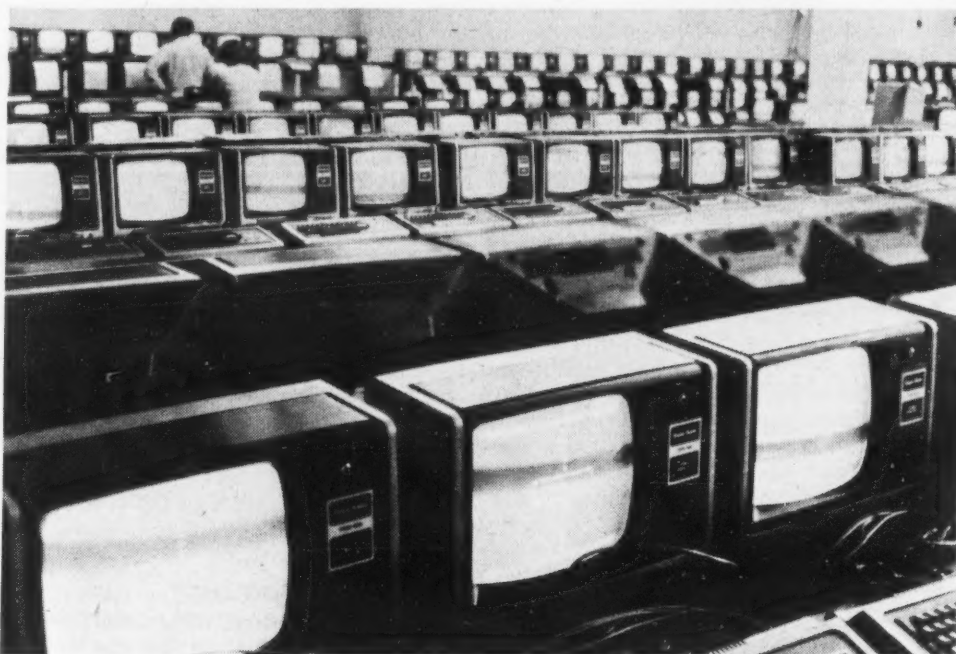
Two Floppies Boost Challenger Options

AURORA, Ohio — Ohio Scientific is offering two microprocessor-based floppy disk computer systems as part of its Challenger II product line.

Based on MOS Technology, Inc.'s 6502A microprocessor, each system features 16K of dynamic random-access memory (RAM), an 8-in. floppy disk drive and an interface, according to a spokesman.

The Model C2-8SK includes an RS-232C serial I/O port for use with an external terminal while the Model C2-8VS has a 32-by 64-character CRT board and keyboard.

The C2-8SK sells for \$1,590 and the C2-8VS costs \$2,090 from Ohio Scientific, 1333 S. Chillicothe Road, Aurora, Ohio 44202.



TV or Not TV?

Not TV. These Radio Shack TRS-80 microcomputer systems are receiving a final burn-

in and quality assurance check before being shipped to customers.

DOES YOUR COMPUTER ROOM LOOK LIKE A BUS STATION?

If you have too many programmers wandering around your computer room or you're tired of using two part console paper or running PRINTLOG, you should take a look at FAGS. It'll keep your people from sifting through mounds of console output. Our console spooling feature gives you job related console messages with your SYSLST output. You can tailor this to your liking at startup, through JCL options, and user exits. A comprehensive hard copy print/archive utility is supplied with the system. Also incorporated into FAGS is a full function partition balancer with not just one balancing algorithm, but four. You can select the method which is right for your processing load. FAGS is a whole bag-full of goodies — and it won't cost you a mint to have it either.

GOAL SYSTEMS — Where R&D comes first.

For a free trial, call or write:

Goal Systems Corp.
P.O. Box 29481
Columbus, Ohio 43229
Phone: 614/ 882-3867
Telex: 245337



With Dual-Mode Capability Motorola Extends Exorcisor Development Unit

INDIANAPOLIS — An extended version of the Exorcisor development system from Motorola Semiconductor Products, Inc. features a variety of compatible modules and a dual-mode capability.

The Exorcisor II has a dual memory map mode of operation which lowers the development time by allowing full use of the microprocessor addressing map, regardless of the unit and its system peripherals, according to a spokesman. Under the dual-mode operation, complete emulation and debugging of the user's system can be achieved since memory in the user's 65K-byte map need not be allocated to the developmental program, which resides in its own 65K-byte map, the spokesman said.

Optional modules for use with the system are provided with a jumpering arrangement for assigning memory and peripherals to either map in the dual-map mode or to any page in extended memory systems, the firm noted. A 20-pin connector on certain modules offers users the ability to implement priority interrupts, multipaged memory and I/O systems, parity error detection

and power-down restart.

Modules include the MPU II, which provides computation and control capabilities as well as 1-, 1.5- and 2-MHz clock timing; and the Debug II, which allows the user to communicate with his system, load programs, monitor the execution of his program in real time and isolate and analyze hardware and software problems, the firm pointed out.

Additional system development and expansion capabilities are offered by two modules that handle both parallel and serial data. The MEX6821-1 PIA II provides 32 lines of parallel I/O capability, while the MEX6850-2 ACIA/SSDA II operates in either a synchronous or asynchronous serial mode.

Also available is a disk control module, a printer interface and several 8K to 64K static random-access memory (RAM) modules, the spokesman noted.

The basic system consists of the MPU II and Debug II modules, power supply and 14-slot chassis, the spokesman explained. A motherboard provides power and signal

connections to the microprocessor control, data and address buses and an RS-232C port, which facilitates communication with peripherals.

The system also comes with

32K bytes of static or dynamic RAM and Macro Assembler/-Linking Loader and Text Editor programs on paper tape, cassette or diskette, the spokesman added.

The Exorcisor II costs \$7,300 to \$7,850, depending on configuration, from Motorola Semiconductor Products, Inc., P.O. Box 20912, Phoenix, Ariz. 85036.

Endorsements Could End Conflict

(Continued from Page 61)

the other is a less than satisfactory solution because neither show organizer can make any firm estimate of attendance or of the number of vendors who will be exhibiting.

And let's not forget the hobbyist. What hobbyist is going to blow the money to visit two shows on consecutive weekends when neither can promise a top-notch exhibit area?

Perhaps the smart money will skip Chicago entirely this year and opt for Dallas on the last weekend of September. An interest in hobby microcomputing abounds in the Southwest, as the turnout at the personal computing portion of last year's National Computer Conference proved.

Several perennial show exhibitors have already indicated Dallas seems like the best bet because the power struggle for

Chicago cannot do anyone (exhibitors, attendees or show sponsors) any good.

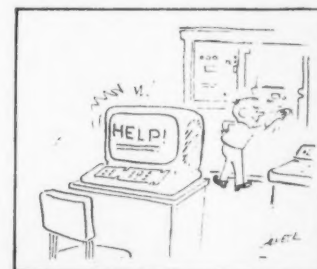
The solution? Obviously, the ideal solution would eliminate show conflicts, but that is probably unrealistic. A more real solution would be for some body, perhaps the Microcomputer Manufacturers Association, to begin a show endorsement program. The trade press is in no position to take over such an endorsement functions; almost every show has been backed (visibly or otherwise) by one or more of the publications serving the hobby.

The advantages of having such an endorsement program would be many. First, a governing body could set up certain requirements for endorsement — aisle widths, accessibility to the handicapped, maximum door prices, number of show hours and the

like. This would ensure that certain minimum standards, for both the exhibitor and the attendee, would be met.

Further, such an endorsement — or lack of it — could mean vendor support for the good shows and a timely death for the shows set up solely to conflict with others.

Judging who is right and who is wrong in the Chicago situation will not be easy. But some order must be established on the show circuit, and an endorsement program could be one way to do it.



ROM (READ-ONLY MEMORY) — 1. A blank ROM can be considered to be a mosaic of undifferentiated cells. Many types of ROMs exist. A basic type of ROM is one programmed by a mask pattern as part of the final manufacturing stage. Proms are programmable ROMs. ROMs are relatively permanent although they can be erased with the aid of an ultraviolet irradiation instrument. Others can be electrically erased and are called Eproms. 2. Information is stored permanently or semi-permanently and is read out but not altered in operation.

SCRATCHPAD — A nickname for CPU memory. It pertains to information which the CPU holds temporarily. It is a memory containing subtotals, for example, for various unknowns that are needed for final results.

SEEK — Computer process for locating specific data in a random access store. Each memory location inspected is a seek and the number of seeks governs the total search time.

SHARED STORAGE — The ability to share main storage between two CPUs. This means either machine can insert information into storage and either machine can access the data and use it.

SKIP — Refers to an instruction to proceed to the next instruction; a blank instruction.

SLEWING RATE — Refers to the rate at which the output can be driven from limit to limit over the dynamic range.

SNA (SYSTEMS NETWORK ARCHITECTURE) — Refers to IBM's standardized relationship between its Virtual Telecommunication Access Method (Vtam) and the Network Control Program (NCP/VS).

SOURCE DECK — Stack of program cards ready to insert into compilers of some computers operated by punched cards.

SPOOLING — Refers to a procedure of temporarily storing data on disk or tape files until another aspect of processing is ready for the data (such as printing it).

STACK — 1. The stack is a reserved area of memory where the CPU automatically saves the program counter and the contents of working registers when a program interrupt occurs. The stack normally forces users to return from interrupts in the same order that interrupts occurred. 2. The stack is generally a block of successive memory locations that are accessible from one end on a last-in/first-out (Lifo) basis. The stack is coordinated with a stack pointer that keeps track of storage and retrieval of each byte or word of information in the stack.

LEARNER'S LEXICON

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

But IBM Gains Only 2.4%

Mainframers' Nets Hit Quarterly Highs

IBM was the only laggard in a group of four mainframers which recently reported first-quarter revenues and earnings.

The industry leader reported only a 2.6% rise in earnings compared with Burroughs Corp.'s 18%, Control Data Corp.'s 21% and NCR Corp.'s 42% increases over the comparable year-ago period.

And IBM would have posted its first earnings decline in more than three years if its earnings had not been buoyed by a foreign currency gain that amounted to \$30 million during the quarter.

The first-quarter earnings set records at each of the four.

At IBM, worldwide earnings totaled \$589 million compared with \$573 million in the same period last year. The earnings equaled \$4.01 a share on 147 million shares, the average number of shares outstanding during the period.

Earnings in the corresponding 1977 period were \$3.82 a share on 150.2 million shares.

Revenues amounted to \$4.4 billion compared with \$4 billion for the year-ago three months.

"Outright purchases of DP equipment showed a modest gain over the first three months of 1977, but a substantial decrease from the record amount in last year's fourth quarter," Frank T. Cary, chairman said.

Revenues from rentals and services increased 8.8% over the first quarter of 1977, Cary pointed out, noting "the first quarter saw the initial shipments of the 3031, 3032 and 3033 processors announced last year, which will be installed in increasing quantities as 1978 progresses."

Burroughs Up 18%

At Burroughs, earnings were \$33.5 million, an 18% increase over the 1977 first-quarter earnings of \$28.4 million. Per-share earnings were 82 cents compared with 70 cents a year earlier.

Worldwide revenue for the first quarter was almost \$505 million, a 14% increase over the \$442.6 million in the 1977 first quarter. Rental and service revenue increased 13% over the year-ago period.

Incoming orders in the first quarter increased 15%, reflecting a continuation of the order levels recorded in the last three quarters of 1977, President Paul Mirabito said.

Control Data Corp.'s 21% increase in net earnings came on a 15.6% increase in revenues for the first quarter ending March 31 compared with the same period in 1977.

Earnings for the quarter were \$15.7 million on revenues of \$604.4 million compared with restated earnings of \$13 million on revenues of \$523 million for the same 1977 period. Earnings per share rose to 90 cents for the first quarter of 1978, an improvement of

20% over the 75 cents per share earned last year.

Data services revenues were up 18% in the first quarter, the firm noted.

CDC's earnings from computer operations in the first quarter totaled \$4.4 million, up 20% over the same period in 1977, and earnings from financial services (Commercial Credit Co.) were \$11.3 million, an increase of 21% compared with restated earnings one year ago.

NCR Up 42%

NCR's income increased 42% in the first quarter of 1978 came from record earnings of \$22.9 million or 83 cents a share com-

pared with \$16 million or 60 cents a share in last year's first quarter.

The 1977 first-quarter net income and earnings per share figures represent a restatement of the previously reported \$16.6 million or 61 cents a share, in accordance with the requirements of the Financial Accounting Standards Board Statement No. 13 which concerns accounting for leases. The effect of Statement No. 13 for the full 1977 will be to reduce previously reported net income by \$1.1 million, the firm said.

First-quarter revenues also reached a new high for the period, rising from \$515.3 million in last year's period to \$559.1 million in the first three months of 1978, a gain of 9%.

Battle Against Software Tax Moving Ahead in Three States

By Marguerite Zientara
CW Staff

New Jersey, Rhode Island and California have recently made significant inroads in questioning and contesting software sales and use taxation and in changing the interpretation of such laws.

In New Jersey, the State Tax Commission recently published its proposed regulation interpreting the law that states that tangible personal property is taxable. This regulation, published April 6 in the *New Jersey Law Journal*, exempts most of the software industry in that state from sales and use tax.

According to Sanford Goldberg, an attorney with Roberts & Holland of New York and tax counsel in the case for the Association of Data Processing Service Organizations (Adapso), the State of New Jersey sent out assessments in 1976 attempting to tax various software operations. When Adapso heard about it, negotiations began, and these are just now bearing fruit in the form of the recently published regulation.

Written statements or arguments relevant to the proposed action may be submitted to the chief tax counselor by April 26. Soon after that date, Goldberg said, the director of the division of taxation will make a final decision on the regulation. If no objections are filed, or if the director does not agree with any filed objections, then the regulation will be adopted as the official interpretation of the State Tax Commission, Goldberg said.

The regulation specifies the criteria under which software is considered intangible personal property: "Preparation or selection of the customer's use requires an analysis of the program for the customer's requirements by the vendor; or the program requires adaptation, by the vendor, to be used in a spe-

cific environment, that is, a particular make and model of computer utilizing a specified output device."

The regulation states that the software may be in the form of systems programs, application programs, prewritten programs or custom programs. It further states that software, "whether placed on cards, tape, disk pack or other machine readable media, or entered into a computer directly," is exempt from tax.

It further specifies that "the person selling exempt software is required to pay the applicable sales or use tax on any tangible personal property transferred to the customer in connection with the exempt service. In addition, the hardware and supplies used to develop the exempt software are not eligible for any sales tax exemptions."

Rhode Island Case

In Rhode Island, Puritan Life Insurance Co. in September 1977 filed two petitions with the state tax administrator [CW, Sept. 12]. One petition sought to eliminate an administrative rule stating software should be taxed as tangible personal property. The second petition was for a hearing on its own tax assessment.

The petition for rulemaking procedure was dismissed in the state superior court because of the fact that Puritan's counsel would be allowed to present the issue before the state tax administrator in its assessment hearing, according to Gordon Cleary, an attorney with Hinckley, Allen, Salisbury & Parsons and one of Puritan's lawyers in the case.

The administrative hearing was held April 6 before a "hearing examiner," a representative of the tax administrator, according to

(Continued on Page 65)

Centronics has refurbishment centers on both coasts to make Centronics Printers' cost of ownership even lower.

Refurbishment Centers in Costa Mesa, CA and Hudson, NH plus more than 100 service centers worldwide mean more service efficiency for Centronics' customers. For full details call today. Toll free: 1-800-258-1952. Or write Centronics Data Computer Corp., Hudson, NH 03051.

CENTRONICS® SERVICE
Simply Better

RCS Firms Reacting to Mini's Inroads: Survey

By Marcia Blumenthal
CW Staff

SAN JOSE, Calif. — Remote computer services (RCS) vendors have begun revamping marketing strategies as the option of acquiring in-house mini-computers gains increasing acceptance among first-time DP users, according to a recent survey by SBS Publishing.

Both segments report that about 50% of the new DP cli-

ents are first-time users who are converting from manual or accounting machine methods, according to survey author, Herbert A. Seidman, who interviewed 30 users and 24 RCS and mini vendors.

A primary marketing concern of both sectors is capturing the new user rather than worrying about those switching from RCS to mini ownership or vice-versa. However, there does appear to

be a greater migration from the RCS option to in-house capability as the monthly DP charges top \$2,000, the survey found.

The small user, as defined in the report, generates billings of less than \$5,000 per month.

Both RCS and minicomputer makers see the low end of the small business market (firms with billings of \$2,000 or less per month) headed for the business-oriented "hobby

shop" market. However, the vendors said they do not consider this loss critical because of the unprofitability of that sector, particularly to the mini maker who is currently experiencing a cost crunch for service related personnel and software development.

Cost Not Only Factor

A surprising finding of the survey was that users do not make RCS vs. in-house deci-

sions based solely on cost.

Usually a firm will select the RCS option to minimize risk of financial loss or personal embarrassment because of lack of experience with DP solutions to business problems.

In House

For the growing number of new users choosing in-house capability, vendor confidence is a major selection factor. Confidence is spurred by trust in a manufacturer's name, successful demonstration prior to purchase commitment, recommendations from DP consultants or knowledge that a friend or a competitor is using a similar system, the survey found.

With the mini industry booming along at an estimated growth rate of 35% to 40%, the main concern of manufacturers is keeping up with the demand and supplying the associated service package.

On the other hand, the RCS sector is growing at 22.5%, although some firms report higher growth rates. In light of greater first-time selection of the mini option and "hobby shop" growth, the RCS sector faces competitive challenges calling for a revamping of strategies, the publisher suggested.

Strategic Trends

Even though SBS predicted no imminent crises for RCS vendors, it noted that several new strategic trends are beginning to emerge.

Most RCS vendors are now offering a small computer option to their existing and potential clients. This stand-alone feature allows clients to do routine processing on-site, but with the enhanced capability of RCS for specialized DP applications and storage of large volumes of data.

Another strategic innovation is specialization in specific industries, particularly manufacturing and distribution.

The complete report costs \$750 and is available through SBS Publishing, Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

TI's Model 810 Printer can make a big impact on your printer costs.

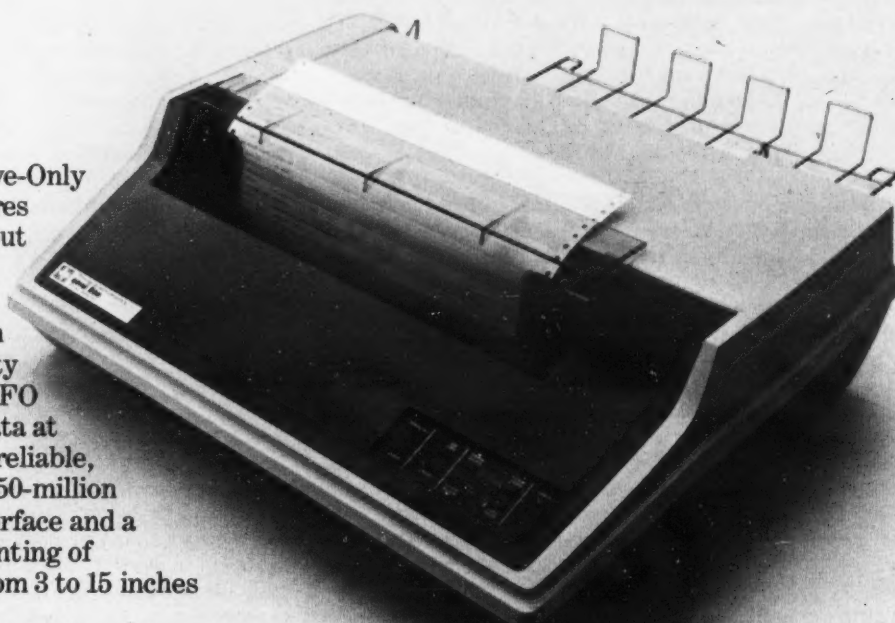
OMNI 800* Model 810 Receive-Only Printer has standard features designed for high throughput and reliability.

Features like bi-directional 150-cps printing of an original and five high-quality copies. A 256-character FIFO buffer so you can receive data at speeds up to 9600 baud. A reliable, low-cost printhead with a 150-million character life. An EIA interface and a self-test capability. Plus printing of reports, tickets or forms from 3 to 15 inches in width.

These and more ... for \$1895.†

For added flexibility, there are options such as vertical forms control with compressed print, expanded print, international character sets, a tear bar and five different interfaces.

Add it all up and you can see why the 810 is the price/performance leader. For more information about how the 810 can impact your printer costs, fill out and mail the coupon. Or call your nearest TI sales office, or Terminal Marketing at (713) 491-5115, ext. 2124.



Yes! I am interested in the Model 810 Printer.

- ☐ Please have your representative call me.
☐ Please send me more information.

Name _____

Title _____

Company _____

Phone _____

Address _____

City _____

State _____

Zip _____

Mail to:

TEXAS INSTRUMENTS
INCORPORATED

P.O. Box 1444, M/S 784, Houston, Texas 77001

17-4-CW

*Trademark of Texas Instruments
†Quantity one, U.S. Domestic Price.

Copyright © 1978, Texas Instruments Incorporated

TEXAS INSTRUMENTS.

OMNI 800
electronic data terminals

THE CHOICE IS YOURS	COMPUTER TERMINALS OWN BY LEASING	
	36 MONTH LEASE PLAN WITH 10% PURCHASE OPTION AT END OF TERM	
	DECwriter II	\$ 52 mo.
	DECwriter III	99 mo.
	DECprinter I	86 mo.
	VT52 DECscope	59 mo.
	VT55 DECscope	94 mo.
	ADM 3A CRT	30 mo.
	TI 745 Portable ...	65 mo.
	TI 765 Bub. Mem. ...	105 mo.
	TI 810 RO Printer ..	80 mo.
	ADDS Regent 100 ..	46 mo.
	Data Prod. 2230 ...	275 mo.
	QUME Ltr. Qual. Ptr. \$115 mo.	
	FlexiFile 21, Fl. Disk ..	\$ 70 mo.
	PURCHASE RENTAL AND 12-24 MONTH FULL OWNERSHIP PLANS AVAILABLE ON ABOVE AND OTHER EQUIPMENT	
	TRANSNET CORPORATION	
	201-688-7800	
	2005 Route 22, Union, N.J. 07083	

Tennessee Bill Retains Tax On Commercial Software

NASHVILLE, Tenn. — The recently signed bill that excluded software from the definition of "tangible personal property" for purposes of taxation in Tennessee has caused some misguided jubilation in the industry. While software was removed from one definition in the law, it was added to another section of the bill, under the definition of a sale, according to Don Collins, assistant director of the State Sales and Use Tax Division.

The definition of a sale now includes "... such transfer of customized or packaged computer software which is defined to mean information and directions loaded into a computer which dictate different functions to be performed by the computer, whether contained on tapes, disks, cards or other device or material. For such purpose computer software shall be considered 'tangible personal property.'"

Along with that disappointing information comes a bit of good news for the industry in Tennessee. H.B. 2026 reads in part: "... the fabrication of software by a person for his own use or consumption shall not be considered a taxable sale."

The only effective change in Tennessee's sales and use taxation policy is that software fabricated in-house in a bank or other organization will not be taxable, but all commercially purchased software will still be subject to tax, Collins said.

The previous law, which taxed all software as tangible personal property became effective July 1. Collins said that the state will not specifically conduct audits on organizations for the nine-month period between the effective dates of the previous and present laws, but that "if we're running on audit, we'll pick it up."

States Fighting Software Taxes

(Continued from Page 63)

Cleary. The hearing addressed the question of Puritan Life's own tax assessment as well as the validity of the rule itself.

The hearing examiner must now make findings of fact and recommend a disposition of the case to the tax administrator, who will then rule on the validity of the assessment and of the rule itself, Cleary said. A decision is expected by early June, he said.

According to William W. Fitzgerald Jr., in-house counsel for Puritan Life, "We feel we'll win it at some level. We may have to go to court to do it, but we're prepared to go further."

Robert Herin, one of the two expert witnesses in the case, called it "the finest hearing I've ever heard on this issue." He is optimistic about the outcome of the case, but noted, "You really can't cope with the arbitrary nature of the government. If you lay out a perfect case and government ignores it, well, you can't control that."

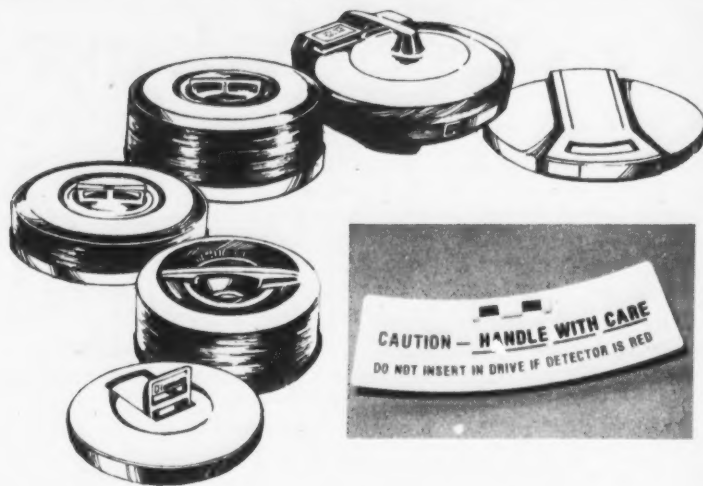
Action in California

Finally in California, the Sales Tax Action Group (Stag) has been granted a day-long public hearing before the State Board of Equalization to deal with the board's Regulation 1502, which dictates the taxation of software and services [CW, April 3]. The meeting is slated for May 4 in Sacramento.

Stag is an unincorporated association of representatives from approximately 150 DP companies based in California or with business activities in California. The organization is presently concerned with questioning and contesting both the validity of the regulation's provisions and the propriety of their enforcement.

Stag believes the Board of Equalization does not fully understand the workings of the DP industry and therefore is not in a position to impose equitable sales and use taxes on it. Stag further believes the board unfairly treats advisory services as fabrication labor so as to include the value of those services in the measure of sales and use tax of any incidental tangible by-product of those services.

Stag feels the board improperly taxes intangible computer programs through contrived logic and is inconsistent in its application of the regulation's provisions, resulting in selective, discriminatory and inequitable taxation.



Head Crash Protection You Just Can't Ignore.

Shockwatch* turns bright red if subjected to a shock that could damage a disk pack or cartridge. So it instantly tells even your newest operator not to insert the damaged media in a drive. And that eliminates the major cause of head crash.

Shockwatch is so dramatic, so simple, and so visible, nobody can miss it. And it's so cost-effective, you can't afford to ignore it. Ask your disk supplier about Shockwatch, or call us — **Media Recovery, Inc., 2550 Electronic Lane, Dallas, Texas 75220, (214) 350-5725.**

Internationally, call your field engineering sales manager at the local **Burroughs** subsidiary head office.

SHOCKWATCH™

Protection. Pure and Simple

*U.S. Pat. No. 4,068,613

**On-line
key entry
for
CICS users!**

See page 8 in the Special Report section for details.

DATA GENERAL NOVA USERS PRODUCTION-MASTER I

Manufacturers Software Package available now for production control requirements

INCLUDES:

Interactive Order Entry
Parts Explosion
Bill of Materials Prep
Where Used Reporting
Material Requirements
Work Center Routing
Stock Status
Standard Costing
Running on Nova 3
Under RDOS, Single and
Multi User Extended Basic

Applied Business Systems

3303 Harbor Blvd.
Suite B-6
Costa Mesa, CA 92626
or call Bill Rhinesmith
(714) 549-9309



**At last!
A low cost
terminal
for your 370.**

With your push-button dial telephones and our P1-5 Data Concentrator, you've got a comprehensive interactive system to front-end your computer. The P1-5 will answer up to 16 simultaneous callers and record their key entries on to dual floppy diskettes, which eliminates the key punching process.

The P1-5 Data Concentrator offers:

- User designated field duplication
- Modulo 10 checks on user designated fields
- Audio response to callers
- Blank fill to the next field with the "*" key
- 3740 diskette compatibility along with automatic Time and Date recording
- Battery backup power supply
- Low monthly cost averaging \$300
- Optional 360/370 multiplexor channel interface for P1-5
- Optional CRT/Keyboard terminals for \$17/month

The P1-5 has almost unlimited applications including General Ledger, Payroll, Time and Attendance Reporting, Production Reporting, Receivables Control, Inquiries and many other uses.

Call us today and we'll tell you how the P1-5 Data Concentrator can help you get in 'touch' with your employees and customers.



PHONE 1
P.O. Box 1522
Rockford, Illinois 61110
Phone 815/962-8927

Nigeria Seen as Large and 'Dashing' DP Market

By Bohdan O. Szuprowicz
Special to CW

With his recent visit to Nigeria, President Carter put that country into global focus as the most populous and apparently the wealthiest of all African states. Nigeria, which only a few years ago refused permission for a visit from then-Secretary of State Henry Kissinger and which deploys Soviet and Czechoslovak jets in its air force, clearly underwent some policy changes in inviting President Carter for an official state visit.

Whether Carter resorted to some form of "dash" to change the minds of the Nige-

rians about Americans remains to be seen.

"Dash" is an established African custom of tendering a gratuity before, rather than

Nevertheless, Nigeria is emerging as a rapidly growing African economy and computer manufacturers are eyeing it as a potentially large

sector, represented by several banks and oil companies.

There is, however, already a nucleus of a computer service industry in Lagos, the capital of Nigeria, where Computer Services Ltd is operating an IBM 370/135 and is believed to be contemplating a time-sharing system. It would have to be local, however, because telephone communications in Nigeria are also in their infancy with only one telephone for every 500 people, and the long-distance network is in the development stages.

On the other hand, Nigeria is plunging into a satellite communications system and already operates 19 ground stations throughout the country.

development without foreign aid.

However, it is still a shortage economy, experiencing rapid growth which results in an annual inflation rate of 25% to 30% and very stiff competition among suppliers of goods.

'Nigerianization' Mandate

In 1972 the Nigerian Enterprises Promotion Decree was promulgated by the government. It mandates various levels of "Nigerianization" in different businesses and industries. There are 22 types of enterprises, including advertising, casinos, lotteries, publishing and broadcasting reserved exclusively for 100% Nigerian ownership.

Another 33 categories require a minimum of 40% Nigerian participation and include equipment manufacturing firms involving local component production.

The computerization prospects for Nigeria are clearly bright although perhaps some distance in the future. But foreign computer equipment and services suppliers have a dashing competition on their hands because Nigeria has the money and wants to go first class while retaining control.

International News

after, a service. Officially condemned by the Nigerian government, it is believed to be vital in doing business in much of Africa.

Yet it does not in itself cut any red tape as is often believed, but only parts it temporarily to snare its adherents still deeper into the practice.

market. Their appetites are further whetted by Nigeria's oil, which is estimated to bring that country between \$7.5 billion to \$10 billion in annual revenues.

Level of Computerization

Another factor is the low level of computerization of an economy where no more than 55 to 60 computers are in operation. Just in case you are wondering whether that's a lot for a developing country, there are an estimated 70 computers on the island of Jamaica, which has a population of only two million.

What is deceiving about Nigeria, however, is the fact that despite its large population, estimated at 67 million to 80 million, and its newfound wealth, it remains a very undeveloped area of the world. Literacy, for example, is estimated at only 25% of the total.

Although Nigeria has a labor force of more than 22 million, only about 1.3 million are actual wage earners; of these, only 560,000 work in modern enterprises.

Therefore, even a mere 60 computers in Nigeria already gives it a computerization rate of about 40 machines per million of nonagricultural labor force, which is considerably better than many other developing countries. It is at least twice as high as the rate for China and way ahead of India, where there are six times as many computers.

Limited Demand

Education and development of the basic social infrastructure has to come before Nigerian industries can come into existence on a more meaningful scale. There is a rather limited demand for computers in what remains predominantly a barter economy.

This is also reflected in the Third Nigerian National Development Plan 1976-1980, which allocates 22.2% of about \$75 billion to the development of transportation systems alone, without which the country cannot be developed, let alone industrialized.

Installation Sites

As a result, computer installations in Nigeria are concentrated at the few universities and in several government departments such as the National Population Bureau, Nigerian Ports Authority and Ministry of Telecommunications, as well as in the private

If you own a TI Silent 700®



get sensitive.

For what you pay for thermal paper, you should get consistent imaging and quick delivery. No maybe's. We say you can. And pay less. Come to the Sensitive Paper People. Try our paper. Free.



Silent 700® is a trademark of Texas Instruments.

sensitivity coupon

Send one free roll for Texas Instruments Silent 700®

Annual Usage: _____ rolls Paper Number: _____

Name: _____ Phone: _____

Firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Mail to Coated Products Division, Graphic Controls Corporation, P.O. Box 1309, Buffalo, NY 14240

Or call toll free 800-828-7978.

(In New York State, call 716-847-7500.)

CW-TI-4

Leading Suppliers

IBM Nigeria is the leader among suppliers of DP equipment so far, but Control Data Corp. made considerable inroads during the 1970s, and the largest computers in Nigeria are now CDC Cyber 72s, one of which is at the Ahman Bello University.

All the other universities at Lagos, Ibadan, Ife and Benin appear to remain loyal to IBM with IBM 370/135 models predominating.

Among minicomputer suppliers, Digital Equipment Corp. and Microdata Corp. are represented while NCR and Burroughs Corp. are making headway with their NCR 299 and NCR 399 and L5000 small business computers.

But potential investors in Nigeria's future should be aware of that country's fierce protectionism of its embryonic industries. It is unique among developing countries because it can finance its own

158

System available
for lease.
Want to purchase.

COMDISCO
312-698-3000



CICS USERS

DASD's new utility map generator
(MAPGEN) will increase your BMS
coding productivity
by at least **75%**

MAPGEN is not a new language. It is a system where the completion of a simple specification form will greatly improve accuracy by eliminating unnecessary data, add flexibility and greatly simplify maintenance. All DFHMSD, DFHMDI and DFHMDF macro source statements are program generated.

A hard copy image of each screen is automatically printed at the time the map is defined.

'Map build' features aid in the use of extended features under CICS/VS.

Call or write today

DASD Corporation
National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/299-5005

DASD
CORPORATION

In Purchasing Stock or Assets Buyers of DP Firms Face Critical Tax Choices

By Brian J. McGowan
Special to CW

The buyer of a DP/software corporation has virtually only two choices when contemplating an acquisition. He can either buy all the assets of the corporation or he can buy the stock of the company and then retain the corporation or liquidate it.

Assuming there are no compelling legal reasons for purchasing either assets or stock, the buyer will normally select the route that will maximize his postacquisition tax deductions and hence his return on investment. This is the name of the game!

In determining which route will accomplish this, the buyer must consider several items including the tax basis of the assets of the target corporation, the existence of net operating losses and the extent of any hidden tax liabilities such as the recapture of depreciation and investment tax credit.

Stock Purchase

To understand these considerations, let's first look at a purchase of stock. From the federal tax point of view, a purchase of stock is the sim-

plest of all methods of acquisition — and in many cases may be the only way the seller is willing to go.

The buyer can acquire the stock by using cash, a method

the Internal Revenue Service (IRS) recoups some of its lost revenue at the buyer's expense. It does this by insisting that the buyer's basis in his new stock is equal to the

This is the first of two articles on the income tax consequences of purchasing or selling a firm in the DP industry. This article covers the consequences from the buyer's point of view, and the second article will cover the seller's viewpoint. Neither part is meant to be an exhaustive treatise but rather a general summary of the provisions of the Internal Revenue Code affecting acquisitions.

that produces an immediate tax event to the seller, or can give the seller a tax deferral by acquiring the corporation in a stock-for-stock exchange. In either event, the tax basis of assets of the acquired company is left undisturbed by the acquisition.

The tax basis of the assets is extremely important since it determines the amount of depreciation and amortization to which the buyer is entitled.

For example, suppose the buyer was contemplating paying \$5 million for the stock of a software company whose assets had a \$10 million tax basis. A stock purchase would leave the \$10 million basis intact. If assets were purchased, the buyer would generally have a tax basis equal to the consideration paid.

One other observation about a stock purchase is necessary. Recall that we said that a buyer could use stock (assuming a corporate buyer) to purchase a new company. While using stock as the medium for consideration usually permits the seller to postpone his gain,

seller's basis.

In our industry, especially in closely held corporations, the basis of the stock of the original owners can amount to peanuts. The upshot of this is that those lingering tax liabilities facing the seller have now become a burden of the buyer and must be faced should he ever decide to sell.

Let's turn our attention to the purchase of assets of a software firm. A buyer will lean toward the taxable purchase of assets when he expects to pay more for the company than the tax basis of its assets.

By buying assets (other than in a merger or reorganization) he hopes to spread the consideration paid over the acquired assets and hence increase their tax basis and thus his depreciation and amortization deductions.

Assume the opposite of the example cited above. Assume that a buyer is willing to pay \$10 million for a software company whose assets have a tax basis of \$5 million. By buying assets directly, a buyer would hope to obtain \$10 million tax basis in the assets and thus increase his tax shelter by \$5 million.

There is however, one admonition I would like to offer. That is, a buyer must be careful to demonstrate that the purchase price of the assets is less than their fair market value. If it is not, to the extent of any excess, the buyer has purchased goodwill, which is not deductible for tax purposes.

In our industry the asset that usually has the greatest value is software. But in most cases, the development costs for software were deducted for tax purposes, so they have no tax basis. An asset purchase will, therefore, be in most instances more desirable than a stock purchase.

Buyer Dilemma

But however anxious a buyer is though to purchase assets, a seller is often unwilling to sell anything but the stock of his company. Clearly a dilemma exists.

Fortunately, Congress foresaw this dilemma and installed

Section 334(b)(2) in the Internal Revenue Code. This code section permits a buyer to purchase the stock of a company, to liquidate the corporation and then, in liquidation, increase the tax basis of the assets.

In effect, although the buyer was forced to buy stock, he enjoys all the benefits of an asset purchase. But be careful — remember the old adage that all that glitters is not gold!

While the Code permits this tactic, one problem arises. That is, in liquidating the company and in stepping up

the basis of the assets for tax purposes, certain dormant tax costs are abruptly awakened. These include the recapture of investment tax credit, the recapture of depreciation and the possible recapture of certain items previously deducted by the seller.

These costs are both real and quantifiable. Clearly, the purchase price paid by the buyer for the stock should reflect their existence.

A former IRS agent, McGowan is now chief financial officer for Sun Information Services Co.

FOR SALE COMMUNICATION TERMINALS

- Teletypes - 28 32 33 35 40 43
 - EIA Cables
 - DECwriters II & III
 - Acoustic Couplers & modems
 - TI 700 series
- Data Communication
Equipment Brokers, Inc.
4915 Fernlee
Royal Oak, MI 48073
(313) 549-3400

**The full-year issue
of the 1977
Computerworld
Index
is now available.**

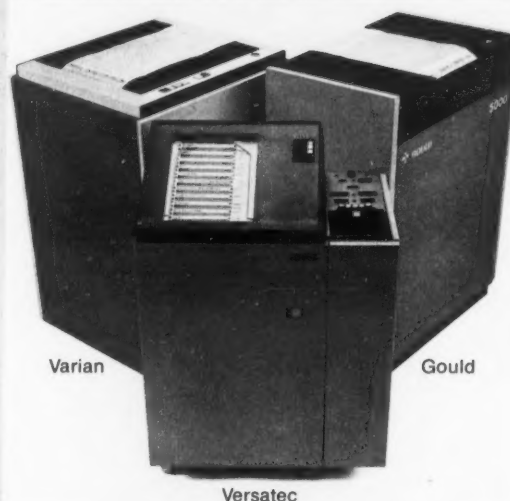
Write or call for details.

INDEX

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

797 Washington St., Newton, MA 02160 • (617) 965-5800

**To owners
of these:**



**new way to
get sensitive.**

See green, the new tinted electrostatic paper. Easier on the eyes. Sharper on the image. Try a roll or fanfold pack free. Exclusively from the Sensitive Paper People.

GRAPHIC CONTROLS
COATED PRODUCTS DIVISION

sensitivity coupon

Send free roll or fanfold pack of eye-ease green to fit: ☐ Gould, ☐ Varian, ☐ Versatec

Annual Usage: _____ rolls Paper Number _____

Name _____ Phone _____

Firm _____

Address _____

City _____ State _____ Zip _____

Mail to Coated Products Division, Graphic Controls Corporation, P.O. Box 1309, Buffalo, NY 14240

Or call toll free 800-828-7978
(In New York State call 716-847-7500)

CW-GE-A

But Lower Costs Predicted

Growth Deterrents Reported in Facsimile Market

SAN JOSE, Calif. — The lack of low-cost facsimile transmission techniques and the failure to recognize differences between market segments are two major deterrents to the growth of the facsimile industry, according to a study recently released by Creative Strategies, Inc. (CSI).

Facsimile's present market niche is primarily limited to the transmission of documents that must be received quickly and must retain some form of graphic structure.

However, as low-cost transmission techniques — network and digital switching and satellite communications — are developed and become operational by 1980, CSI estimated the

transmission cost for a one-page document will be less than the cost of first-class mail.

At that time, the industry is expected to grow at more than 20% annually compared with the present rate of 17%.

Two-Segment Market

While the transmission cost factor is a serious problem, CSI also pointed out that most competitors fail to discern that the business sector, a major portion of the present market, really consists of two distinct segments — the convenience system and the operational system — each with distinct needs and different marketing requirements.

The convenience segment consists of low-volume users — those transmitting four to five messages per week, usually limited to priority documents. These users are less concerned with the cost of a particular message than they are with the cost of equipment, so they tend to avoid automatic features. Their systems are contained in the office environment.

The operational segment, in contrast, is a high-volume, planned communications system, extremely sensitive to message costs. These users are willing to invest in expensive equipment featuring high transmission speeds and automatic features.

The study indicated that prices must

drop well below \$200/mo for a 1 page/min facsimile system to open up the operational market.

Competition Growing

Competition for facsimile is already growing. Some strong Japanese companies are entering the market. Panafax, a joint venture of Matsushita Communications Industrial Co. and Visual Sciences, Inc. is expected to produce a two-minute facsimile unit that will be offered to less than \$70/mo.

In the long term, CSI estimated IBM will be the most formidable new entrant with its Satellite Business Systems transmission capability.

The report costs \$695 and is available from Creative Strategies, Inc. Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

The 370/138 and 370/148. Two great computers.

We lease them for less. NOW.

If you've decided to install a 370/138 or 370/148, call Greyhound. If you've already placed an order for a 370/138 or 370/148, call Greyhound. If you have one of these computers installed, be sure and call Greyhound.

If you have a need for the computer now but you have been given a late delivery date, call Greyhound. We'll deliver one of our 138's or 148's when needed and still lease it at substantial savings.

If you order between now and June 15, you can take advantage of our special

1 to 5-year True Operating Leases* that can save you a

substantial amount of money every month. And no matter whether you've just decided on a 370, or have taken delivery of one, we'll work out a lease plan that will pay off handsomely on the bottom line at the end of the year.

If you've chosen a 370/138 or 370/148, you've selected one of the best computers in the world. At Greyhound, we create the best lease plans in the world. So you can have their great computer... at our low price. Call today.

CALL: 800-528-6113



GREYHOUND COMPUTER CORPORATION

Greyhound Tower, Phoenix, Arizona 85077

*True Operating Leases — Walk-away at end of term... Without penalties or residual guarantees

Contracts

Beehive International has received a \$1.3 million contract from Kienzle Apparate, GmbH of W. Germany for additional terminals.

Newsweek Magazine has signed a contract with United Computing Systems that will optimize its weekly shipping routes.

The Egyptian Electricity Authority has selected Control Data Corp. as prime contractor on a \$37 million computer-based system to monitor and control Egypt's major electric power network.

System Integration Associates of Philadelphia has received a \$500,000 contract from Digital Applications, Inc. for microcomputer system components. The firm will use the system components in pharmacy prescription processing and in the acceptance and processing of cash register tapes.

Computing Devices Co. of Ottawa, a division of Control Data Corp.'s aerospace operations, has won a \$950,000 contract for airborne projected map display systems. The award was made jointly by the U.S. Air Force and the Navy.

The Kennedy Co. has been awarded a \$400,000 contract for its Series 9000 tape transports and its Model 9219 formatters by Tab Products Co., Palo Alto, Calif.

Integrated Software Systems Corp. (Issco) has been awarded a contract from American Management Systems, Inc. (AMS) of Arlington, Va. Under the terms of the agreement, AMS will lease Disspla, a proprietary software system, from Issco for use on the AMS time-sharing service, Amshare.

General Telephone & Electronics Corp. has received a \$4 million contract to provide its GTE Financial System One to all locations of Piper, Jaffray & Hopwood, Inc., a major brokerage firm headquartered in Minneapolis, Minn.

Nixdorf Computer AG of Paderborn, W. Germany, has signed a \$3 million contract with Cipher Data Products for tape drives.

POSITION ANNOUNCEMENTS

position announcements

position announcements

position announcements

Operations Systems Officer

California First Bank has an immediate opening in San Diego for an Operations Systems Officer.

Position involves research, development, analysis, and implementation of operating procedures and forms in conformance with bank policy and government regulations. Assignments will include development of new or revised procedures as required by new automated systems and changes to existing systems.

Requirements include: knowledge of EDP systems and terminology; working knowledge of accounting fundamentals; analytical ability, and good written communications skills. Knowledge of branch banking helpful.

Excellent salary and benefits program.

Please send resume including salary history and salary requirements in confidence to:



California First Bank
Personnel Department
P.O. Box 1311
San Diego, CA 92112

Equal Opportunity Employer M/F

SYSTEMS PROGRAMMERS: PROGRAMMER ANALYSTS: Michigan State University

Computer Laboratory is looking for a lead systems programmer, systems programmers, and programmer analysts.

The Computer Laboratory is responsible for developing a multi-mainframe interactive distributed network and providing associated user services. Current hardware includes CDC 6500-6400 with Interdata 7/32 front ends.

Qualifications on CDC CYBER computers for these positions include:

Programmer Analysts-

a good working knowledge of a high level general purpose language. Experience with user documentation writing, course instruction, and user consulting is highly desirable. Salary: \$12,950 to \$18,130.

Systems Programmer-

experience in PP programming, assembly language, and a good working knowledge of one high level language. Salary: \$14,050 to \$19,670 per year.

Lead Systems Programmers-

B.S. in related field or equivalent education and experience. Considerable experience as a systems programmer. The ability to design, implement, and document complex new software systems or extensive modifications of existing software. Salary: \$16,610 to \$23,260 per year.

Send your resume and salary history to the Personnel Office, Michigan State University, 110 Nisbet Building, East Lansing, Michigan 48824, no later than May 19, 1978.

Michigan State University is an equal opportunity employer and eagerly seeks all qualified people.

SCIENTIFIC PROGRAMMER ANALYST Pharmaceutical Research

We are adding another position to our research support staff. If you seek a career opportunity, this opening is worth serious consideration.

It requires a detailed knowledge of FORTRAN or PL1. Candidates should also have one or more of the following:

- INQUIRE experience
- COBOL
- Knowledge of techniques in statistical analysis
- Previous experience in a clinical or laboratory environment

Experience level should be a minimum of 2 years.

In addition to the opportunity this position offers to participate in medical research, you will find the benefits attractive in our suburban location easily accessible by highway or public transportation.

Resume should be sent to: Manager, Research Employment, Schering-Plough Research Center, 60 Orange St., Bloomfield, N.J. 07003.



Schering-Plough

We Are An Equal Opportunity Employer M/F

LOOK to
tomorrow
and find...

WANG

LABORATORIES, INC.

WANG LABORATORIES' innovative approach to the word processing and computer industries is making our leadership in the marketplace of tomorrow assured. Our R&D teams create state-of-the-art and beyond ... our manufacturing teams put out a well-made product ... our marketing staff keeps our name in the forefront of the industry ... and our support staff keeps our operation running smoothly. It is exciting and satisfying to work at WANG Laboratories. If you are good at what you do, why not investigate joining us?

Commercial Programmer/Analyst

Join a select group of computer professionals who are dedicated to enhancing and maintaining WANG's Human Resource Management Systems in today's competitive software product marketplace. To qualify, you should have:

- Familiarity with large business software applications
- At least 2 years experience with ANSI COBOL and an IBM 360/370 environment
- The necessary impetus to successfully meet required deadlines.

Field Service Instructors

Qualifications:

- 2 years experience as Technical Instructor
- 2 years field service experience in support of minicomputer systems

Responsibilities:

- Curriculum development
- Structure and conduct field service training classes in support of microprocessor controlled, disk-based systems.

Software Technical Writers

WANG is looking for software technical writers to document our new state-of-the-art 2200VS computer system. We need people with the technical ability to understand the various facets of a modern computer system and the writing ability to explain them clearly and coherently to others. We offer plenty of growth potential and the opportunity to work in a creative, challenging environment where individual achievement is recognized and rewarded. Our requirements are:

- Knowledge of at least one high level language, preferably COBOL, BASIC, or RPG II. (Knowledge of an Assembler language would be a plus.)
- Familiarity with a major computer operating system
- 1-3 years experience documenting or working with system software (programmers with a flair for writing are invited to apply).
- The initiative and creativity to follow a project through from initial research to final copy.

If you meet these requirements, we'd like to talk with you.

Senior Customer Training Specialist-Computer Systems

A career opportunity exists for a person who enjoys the challenge of educating customers and internal marketing people on the utilization of computer hardware and operating system features. You will have the opportunity to be creative and apply your knowledge in the development of new courses as well as modification of existing programs. This position requires a person:

- Who is creative and self-starting.
- Who has at least 3 years experience in the following areas:
 - Instructional experience in hardware and/or Operating Systems to Customers. Prefer Virtual Storage Systems.
 - Knowledge of interactive and time sharing systems
 - Field Experience as a Systems Analyst/Programmer with applications knowledge
 - Excellent programming experience in RPG II and COBOL.
- Who has excellent communications skills.

If you have the experience and are interested in this growth position, we want to speak with you.

Sales Training Specialist - Computer Systems

The Education Center has a rewarding and challenging opportunity for a person who has been successful in sales and has the ability to train salespeople in product and skills. This is a highly visible position which requires a person to have:

- A minimum of 3 years of computer sales experience, preferably with knowledge of transaction and interactive computer systems
- The knowledge and ability to relate hardware and operating system features to the sales force
- Successful sales skills knowledge
- The ability to communicate well with all levels of management
- Excellent writing skills.

Additional requirements: College degree and training experience preferred.

Excellent salaries and earning potential plus superior company benefits. Please send resume including academic background and salary history and requirements to:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG

LABORATORIES, INC.

One Industrial Avenue
Lowell, Massachusetts 01851

We are an equal opportunity/
affirmative action employer.

position announcements

position announcements

position announcements

position announcements

position announcements

The life style you've been seeking... The income your talent deserves

Are you technically satisfied? Does your income match your talent? If not, Control Data and Minnesota can offer you what you are seeking. Our division is extraordinary in that we have built a team of IBM talent that is one of the best in the world. You can be a part of that team.

PROGRAMMER/ANALYST—IBM A new opportunity to participate in a major new development in the Computer Industry—our end-user Systems Software Development Group. This position requires a minimum of 2-3 years IBM assembler coding experience, and a working knowledge of the following areas:

- O/S JCL
- Utilities
- Data Management/Job Management
- Supervisor Services

SYSTEMS PROGRAMMER—IBM Excellent position for the individual with 2-3 years IBM assembler coding experience and a working knowledge of O/S JCL, Utilities, Data Management/Job Management and Supervisor Services. In addition, you must have an internal knowledge and hands-on experience in one or more of the following:

- MVT
- VS1
- SVS
- MVS
- Structured Programming
- TSO
- S/370 Sysgen
- Performance Measurement Tuning

SYSTEMS EDUCATORS—IBM Excellent opportunity to develop and present courses on hardware utilization and software internals. Position requires experience in:

- IBM Operating Systems • Education

H-6000 SYSTEMS/SOFTWARE PEOPLE Opportunity to participate in a major new development in the Computer Industry—our OEM Systems Software Development Group. This position requires hands-on experience with one or more of the following:

- File Structures
- COBOL/H-6000
- COBOL-74
- Structured Programming
- GMAP
- UFAS
- JCL

COMPUTER FACILITIES SYSTEM ANALYST—IBM Position performing Software and Hardware Configuration Planning for a Computer Facility consisting of 370, 155, 370/148, OMEGA/480 and running various IBM Software Systems. Responsibilities will include:

- Planning
- Sysgens
- Training
- System Maintenance
- Interfacing Customers Users

ENGINEERS—MEMORY OR DISK Excellent opportunity to support the CDC add-on Memory or Disk products for IBM 370/135 through 370/168 CPU's. These positions require engineering design or continuation support experience on CPU main memories or disks.

ENGINEER Position offering support to MASS Storage, a major breakthrough in the technology of data storage and retrieval. Position requires:

- Micro Diagnostics
- Willingness To Travel
- Microcode Controlware
- Ability to Pass Top Secret Clearance

CUSTOMER SERVICE ENGINEER Excellent opportunity for worldwide travel. Responsibilities include installing and support of peripheral products. Position requires knowledge of:

- CPU Mainframe
- Diagnostics

ENGINEERS—OMEGA Positions providing support to the OMEGA 370 compatible CPU design and development. Requires experience in one or more of the following areas:

- IBM System Architecture
- CPU Mainframe Development
- Microprogramming
- Plug Compatible Peripheral Controls

SOFTWARE SUPPORT ENGINEER Opportunity for worldwide travel for the individual capable of installing and providing maintenance support to IBM SCP's. Experience in one or more of the following areas required:

- DOS/VS
- SVS/VS2
- VS1
- OS

SYSTEMS DESIGNER—IBM Position for the professional to do Systems Planning and Design of New Peripheral Systems. Requires a working knowledge of:

- OS Internals
- Global System Design
- Data Base Management
- Excellent Communication Skills

If you meet the qualifications above and are willing to accept the challenges of our dynamic organization, then don't hesitate. These positions are located in beautiful Plymouth, Minnesota, a western suburb of Minneapolis. You can trade traffic, crime, and pollution for 10,000 lakes, pheasants and trees.

For immediate and confidential attention, please call COLLECT or send your resume to:

Peggy L. Bernhardt
PERIPHERAL SYSTEMS
GROUP
2200 Berkshire Lane
Plymouth, Minnesota 55441
(612) 553-4720

CD CONTROL DATA CORPORATION

An Affirmative Action Employer M/F

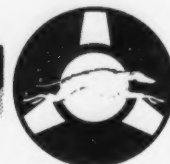
Computer Leasing /Sales

We are expanding our Sales staff and need a proven top performer in the Computer Leasing/Sales IBM 360/370 market in New York City and Philadelphia. Our compensation plan offers high potential and excellent fringe benefits.

As a member of our sales staff, you will sell as well as lease computer hardware with the financial strength of Greyhound Computer Corporation, the nation's largest third-party lessor, a wholly-owned subsidiary of The Greyhound Corporation.

Qualified applicants may apply by submitting a resume including salary history, in confidence to: Greyhound Computer Corporation, Manager Administration and Personnel, Greyhound Tower-15th Floor, Phoenix, AZ 85077.

Equal Opportunity Employer M/F/V/H



GREYHOUND COMPUTER CORP

ADP ANALYSTS PROGRAMMERS COMPUTER OPERATORS

**Overseas Opportunities in Middle East
with Major U.S. Company**

ADP professionals wanted for military-oriented supply and logistics support in Saudi Arabia. We offer qualified individuals the chance to broaden their expertise in the following areas:

COMPUTER OPERATOR:

Must have 3-4 years recent experience operating IBM 360/370/Systems 3; experience in tape, disc, and teleprocessing systems and peripherals; knowledge of RPG II and COBOL required for some positions.

EAM OPERATOR:

Should have 2-3 years experience as sorting and tabulating machine operator; knowledge of electrical accounting and auxiliary electronic computer equipment; knowledge of control panel wiring, insertion procedures, and Hillerith coding; knowledge of procedures for correcting equipment failures.

EAM EQUIPMENT REPAIRMAN:

Must have 4 years experience in repair and maintenance of all types of IBM EAM equipment.

EDP SYSTEMS ANALYST:

Must have 3 years experience in ADP systems analysis; expert knowledge of current ADP hardware/software; qualified in development of data base retrieval systems, complex systems design, and telecommunications; proof of involvement with development of a major automated system; strong background in ADP logistics applications (preferably military supply); familiarity with RPG II, COBOL and Assembly language; knowledge of IBM 360 and System 3.

SR. EDP SYSTEMS ANALYST:

Must have 8 years experience in systems analysis; expert knowledge of current ADP hardware/software; qualified in development of data base retrieval systems, application of operations research techniques, use of logic tables, complex systems design, and telecommunications; proof of involvement with development of a major automated system; strong background in ADP logistics application; familiarity with RPG II, COBOL, and assembly languages; knowledge of IBM 370 and System 3; BS degree in computer science or related field is mandatory.

EDP PROGRAMMER:

Must have 5 years experience in ADP programming; knowledge of current ADP software development techniques; programming for telecommunications/teleprocessing; programming proficiency in COBOL, Assembly language, and RPG II; experience with IBM 370 and System 3.

SENIOR EDP PROGRAMMER:

Must have 8 years experience in ADP programming; knowledge of current ADP hardware/software techniques; programming for telecommunications applications; proficiency in COBOL, RPG, and assembly; proof of involvement with major systems programming effort; knowledge of IBM 370 and System 3; ability to plan and manage large scale projects; BS degree in computer science or math mandatory.

SENIOR SOFTWARE SYSTEM PROGRAMMER:

Must have 6 years experience in DP with 3 years extensive experience in programming, file structures, data base design and management, data communications design concepts, communications systems programming, communications access methods, line control techniques, advanced coding techniques, DOS/VS operating system programming, and IBM 370 and System 3 hardware architecture; familiarity with COBOL, RPG II, POWER/VS; expertise in JCL, DOS/VS, CICS, and assembly languages; BS degree in computer science or math is desirable.

All positions provide excellent salary and benefits which include free housing, low food costs, and liberal leave and vacation. Please send resume to:

CW Box 1545
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer M/F

Immediate and Future Professional Positions for
Programmers / Analysts / Software & Hardware Specialists

SYSTEM DEVELOPMENT CORPORATION

ANNOUNCES THEIR SKILLS INVENTORY BANK
FOR PRESENT AND FUTURE CAREER OPPORTUNITIES.

SDC is constantly bidding and winning contract awards on new and challenging state-of-the-art work. As a leader in the information systems field and as an aggressive organization that recognizes the trend for total plug-in information systems designed and integrated by a single manufacturer, **SDC** can offer unexcelled opportunity for career development in both hardware and software areas.

SDC is a company that believes in upward mobility. "Promotion from within" is our policy. Our employees can also move laterally from one department or division to another for professional growth.

SDC's Staffing Department will match your expertise with our current job requirements and you will be contacted to determine your interest and availability. Should there not be an immediate position for you, you will be notified, your name will be placed in our automated Skills Inventory Bank, and you will receive our Career Opportunity listings on a regular basis.

An Equal Opportunity Employer M/F



SKILLS INVENTORY BANK

NAME _____
ADDRESS _____
CITY/STATE _____ ZIP _____
HOME PHONE _____ WORK PHONE _____
EDUCATION _____ YEARS OF EXPERIENCE _____

EAST COAST MAIL TO:

Mr. J.J. FitzGerald
SYSTEM DEVELOPMENT CORPORATION
7929 Westpark Drive
McLean, Virginia 22101

WEST COAST MAIL TO:

Mr. Walt Stephens
SYSTEM DEVELOPMENT CORPORATION
2500 Colorado Avenue
Santa Monica, California 90406

GEOGRAPHIC PREFERENCE: Please put a number in the box with each location, using the code below:

1 = Preferred 2 = Will consider under special conditions 3 = Will not consider

- | | | |
|---|--|---|
| <input type="checkbox"/> Boston, Massachusetts | <input type="checkbox"/> McLean, Virginia | <input type="checkbox"/> Santa Monica, California |
| <input type="checkbox"/> Chicago/Oakbrook, Illinois | <input type="checkbox"/> Milwaukee, Wisconsin | <input type="checkbox"/> Sunnyvale, California |
| <input type="checkbox"/> Hampton, Virginia | <input type="checkbox"/> New Orleans, Louisiana area | <input type="checkbox"/> Vandenberg AFB, California |
| <input type="checkbox"/> Huntsville, Alabama | <input type="checkbox"/> Raleigh, North Carolina | <input type="checkbox"/> Virginia Beach, Virginia |
| | <input type="checkbox"/> San Diego, California | |

LANGUAGES: Please rate your skills using the scale below:

- 1 = Basic knowledge/schooling
2 = Perform under direction
3 = Perform independently

- | | |
|--|----------------------------------|
| <input type="checkbox"/> Algol | <input type="checkbox"/> Fortran |
| <input type="checkbox"/> APL | <input type="checkbox"/> Jovial |
| <input type="checkbox"/> Assembly | <input type="checkbox"/> Pascal |
| <input type="checkbox"/> CS-1 or CMS-2 | <input type="checkbox"/> PL-1 |
| <input type="checkbox"/> Cobol | <input type="checkbox"/> GCOS |
| | <input type="checkbox"/> Compass |

HARDWARE: Please indicate your years of experience.

- | | |
|--|---|
| <input type="checkbox"/> Amdahl | <input type="checkbox"/> IBM 360/370 |
| <input type="checkbox"/> Burroughs 5700 | <input type="checkbox"/> Microprocessors |
| <input type="checkbox"/> 7700 series | <input type="checkbox"/> PDP-11 |
| <input type="checkbox"/> CDC 3800 | <input type="checkbox"/> TI-960 |
| <input type="checkbox"/> CDC 6000 | <input type="checkbox"/> Univac 1100 series |
| <input type="checkbox"/> Cyber | <input type="checkbox"/> UYK 7 & 20 |
| <input type="checkbox"/> Honeywell 6000 series | <input type="checkbox"/> Univac 642 |
| <input type="checkbox"/> HP 21MX | |

AREAS OF APPLICATION: Please indicate your years of experience next to application.

- | | | |
|--|---|---|
| <input type="checkbox"/> Accounting/Finance Systems | <input type="checkbox"/> IMS | <input type="checkbox"/> Signal Processing |
| <input type="checkbox"/> Air Force Command & Control | <input type="checkbox"/> Interoperability Systems | <input type="checkbox"/> Simulation Test & Evaluation |
| <input type="checkbox"/> CICS | <input type="checkbox"/> Insurance Claims | <input type="checkbox"/> Software Engineering |
| <input type="checkbox"/> Communications Processing | <input type="checkbox"/> Inquire/Retrieval | <input type="checkbox"/> Systems Engineering Activities |
| <input type="checkbox"/> Computer Networks/Protocols | <input type="checkbox"/> Linguistics | <input type="checkbox"/> Systems Integration |
| <input type="checkbox"/> Computer Network Security | <input type="checkbox"/> Message Switching | <input type="checkbox"/> Tactical Data Communications |
| <input type="checkbox"/> Computer Systems Architecture | <input type="checkbox"/> MIS | <input type="checkbox"/> Tactical Military Operations |
| <input type="checkbox"/> Data Base Management | <input type="checkbox"/> Newspaper Systems | <input type="checkbox"/> Test Programs |
| <input type="checkbox"/> Consoles & Displays | <input type="checkbox"/> NTDS | <input type="checkbox"/> Transaction Processors |
| <input type="checkbox"/> Digital/Voice radio | <input type="checkbox"/> On-line Programming | <input type="checkbox"/> Underwater Acoustics |
| <input type="checkbox"/> Dispatch Communications | <input type="checkbox"/> Operating Systems | <input type="checkbox"/> WWMCCS |
| <input type="checkbox"/> Hardware/Software design | <input type="checkbox"/> Satellite/Space Systems | |

position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER/ANALYSTS

There's One Company That Has Growth, Challenge and Stability!

CSC can offer you all those and more. We are the leader in the information sciences industry with over 8,500 computer professionals and we're continuously expanding into areas allowing professional stimulation and growth.

CSC's System Sciences Division deals with the space sciences in a unique way, calling for a degree in Computer Science, Math, Physics, Astronomy or Engineering. Fortran and/or Assembly Language background required. You will work on highly complex projects requiring programming and analysis of major systems.

Opportunities include distributive network systems, data base management, real-time satellite command/communications systems, real-time operating systems, 360 OS Fortran programming AND microprocessor and minicomputer software design and development.

You will be supporting our Mission Support, Scientific and Applications, and Space Tracking Data Network Projects with the NASA Goddard Space Flight Center, located in the Maryland Suburbs near Washington, D.C.

We offer competitive salaries and a complete benefits package including liberal relocation. For further information, please send resume or call:

Staffing Department
Toll Free: 800--638-0842 OR Call Collect: (301) 589-1545

COMPUTER SYSTEM SCIENCES DIVISION
SCIENCES 8728 Colesville Road, Silver Spring, Md. 20910
CORPORATION Major Offices And Facilities Throughout The World
An Equal Opportunity Employer

Commercial Systems Course Developers

Merrimack, New Hampshire

Responsible for providing technical training to Digital customers and employees, the Educational Services group is seeking professionals with a solid technical knowledge and a desire to become involved in course development work. We currently need individuals to work as a part of a Course Development team providing courses in the area of Commercial Applications and Systems.

The Commercial Systems Course Development group, located in Merrimack, New Hampshire is looking for highly qualified people with skills and backgrounds in the following areas:

- Commercial Systems Design
- Large/Mini Computer-based Systems Analysis
- Commercial Applications Systems Analysis

Writing experience in the area of Educational Technology is also desirable.

If you are interested and qualified, please forward your resume including salary history to Mary Ann Joyce, Digital Equipment Corporation, Dept. H424 3807, 129 Parker Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

digital

INFORMATION SYSTEMS

Career opportunities are now available with Aspen Systems Corporation, a Washington, D.C.-based leader in the growing information industry. Current environment includes IBM 360/70, OS or VS system. Several new development projects now underway. We have immediate openings for the following:

MANAGER SYSTEMS DEVELOPMENT

To plan, control and administer all activities within our software development for test processing, document file management and report generation. Must have proven ability to manage project team leaders in design and development activities. Highly visible position with great responsibility and advancement potential. Degree required, advanced degree preferred.

SENIOR PROGRAMMER/ANALYST

Design and development of information systems using assembly language and IBM 360/370, OS or VS. Requires 4 years strong experience with a degree desirable.

PROGRAMMER/ANALYST

In our national clearing house, we have a position for a programmer/analyst to participate in the development of large scale textual information storage and retrieval systems with a most experienced team of analysts and programmers using SAMANTHA and other state-of-the-art techniques with utilization of mini computer systems for data capture and editing. Experienced in IBM 360/70, OS/VS systems, ALC, COBOL, JCL, and utilities is a must. Knowledge of text data base processing desirable.

To apply, please call J. Petersen at (301) 428-0700, or send resume with salary history to:

ASPEN SYSTEMS CORPORATION



20010 Century Boulevard
Germantown, Maryland 20767
An Equal Opportunity Employer

western union

PROGRAMMER ANALYST

DEVELOP ON-LINE APPLICATIONS FOR MAJOR TELECOMMUNICATIONS COMPANY

We're a small division of Western Union headed toward an exciting future. Harnessing modern technologies in data processing and engineering, we're producing a variety of advanced computer systems. These translate into interesting assignments and ongoing opportunities for recognition and advancement.

You'll develop front end processors for point of sale terminals and other on-line commercial applications

on a PDP-11. At least 1-5 years' experience in PDP-11 computer programming required.

This challenging opportunity offers some travel, the cultural and recreational resources of Northern New Jersey living — 30 minutes from New York City, and excellent salary and benefits. Please send resume, in confidence, to: Ms. M.A. Wakin,

Western Union Teleprocessing, Inc.

82 McKee Drive, Mahwah, New Jersey 07430
An Equal Opportunity Affirmative Action Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Systems Analysts Programmer Analysts

HANES HOSIERY is seeking aggressive, EXPERIENCED, career-oriented systems professionals with a broad range of business systems skills.

These positions offer opportunity to participate in the development of sophisticated EDP systems using the latest in software and hardware features including: powerful on-line program development software, data base management, transaction processing software, and distributed processing. We are committed to a position of leadership in EDP utilization and consequently offer excellent opportunity for professional growth and accomplishments.

HANES HOSIERY offers attractive fully competitive salaries plus comprehensive benefits, and the security of being with a very strong, successful and expanding company. Our southeastern location affords very pleasant living in a mild, sunny climate, in a community of 230,000 people that is nationally recognized for its cultural achievements.

If you feel that you qualify, please send resume including SALARY DATA in confidence to:

Management
Recruitment Coordinator
HANES HOSIERY

Hanes A Division of the Hanes Corporation
A "FORTUNE" 500® COMPANY
P.O. Box 1413, Winston-Salem, N.C. 27102
NO EMPLOYMENT AGENCIES, PLEASE!
Affirmative Action Employer

Hanes Hosiery manufacturer of:

Hanes beautymist. MAY QUEEN
Today's girl. Underalls. Slenderalls

PROGRAMMERS

Programming Opportunities at Microform

San Francisco Peninsula

We're young. We're dynamic. And we can offer exciting and challenging career opportunities. As a leading manufacturer of microcomputer controlled information storage and retrieval systems, we have one of the fastest growth records in the industry, and we need people who are ready to take on more responsibility. Come join us.

Senior Programmer Analysts

Involves design and development of real-time multiprocessor systems. Must be familiar with assembler and minicomputer languages with experience in PDP 11 operating systems internals environment. Will be involved with operating systems development. Also need people with RSX-11 M experience.

Microprocessor Programmers

Will work in our airline divisions on multimicroprocessor data communications equipment. Ideal candidate has data communications experience and Intel 8080 microprocessor background. Desire aggressive programmer for a position with unlimited growth potential in the microprocessor field.

Development Programmer Analyst

Requires a thorough understanding of high level languages with background in real-time, data-base, BAL, ALGOL, and minicomputer-based multiterminal systems, preferably TAND-EM and HP 3000 computers. Desire BS or BA plus 5-10 years' experience in design of on-line computer systems.

Manager Systems Development

Need working manager with strong data processing experience in hardware/software/application with DEC PDP 11 experience. Will be involved in development of real-time systems for medical systems development.

Microfilm offers excellent salaries and benefits, including a unique preventive health care plan and dental insurance.

For immediate consideration, please send your resume to our Employment Office, Microform Data Systems, 830 West Maude Avenue, Mountain View, CA 94043. An equal opportunity employer m/f/h.

**MICROFORM
DATA
SYSTEMS**

COMPUTER SYSTEMS PROFESSIONALS

We Have Room For Your Imagination And Innovation!

At National we are making an investment to change computer design through semiconductor technology. This is part of our commitment to making computers accessible to a broader market at a more effective price and performance, than is available today.

INVEST IN YOUR FUTURE BY JOINING NATIONAL'S COMPUTER PRODUCTS GROUP

CALL JIM ROOK*

For immediate appointment or information:

(800) 672-1811 (In California)
(800) 538-1866 (Out-of-State)

Monday through Friday 8:30 am to 5:30 pm

Computer systems professionals with areas of specialties that include: Mini, Micro, Mainframe, and Memories... the following positions are currently open:

- Software Development
- Mechanical Packaging
- Software Support
- Technical Support
- Manufacturing Engineering
- Analog Design
- Digital Designers
- Design Drafting
- Field Service
- Marketing
- Product Management
- Quality Engineering
- Micro Code Specialists
- Test Engineers
- Software/Hardware Training Specialists
- Order Processing Administrator
- Material Production Control Planners

FUTURE MANAGEMENT OPPORTUNITIES IN ALL AREAS

Areas of experience should include major mainframe manufacturer's, mini-computer manufacturer's and microprocessor manufacturer's. 3 to 5 years working experience with CPU's, peripherals, operating systems, traditional languages, and systems configuration or integration knowledge, plus a technical education is required.

National-a company making technology tools for people. If unable to call, send your resume to the address listed below.

Join Us In Our Goals

**National
Semiconductor**

COMPUTER PRODUCTS GROUP
2900 Semiconductor Drive
Santa Clara, CA 95051

We are an equal opportunity employer
male/female/and handicapped



ARIZONA

Programmer/Analyst

Pinal County, third largest county in Arizona, offers a career opportunity in our Data Processing Dept.

Successful candidates must have IBM System/3, RPG II programming experience, CCP experience preferred. Current system: System/3 Model 15D.

Excellent salary and advancement opportunities offered. Send resume with salary requirements and history to: Larry Naegle DP Dir, PO Box 726, Florence, AZ. 85232 (602) 868-5801



COMPUTER CENTER DIRECTOR (LOS ANGELES AREA)

Plans and directs all activities of university computer center. Represents the center in discussions with other campus units and systemwide Chancellor's Office. Required qualifications: five years progressively responsible experience in data processing, including three years managing all phases of a DP installation (experience with large data bases and large-scale timesharing systems desirable); equivalent to graduation from a four-year college or university (advanced degree preferred). Salary \$25,644 - \$30,984. Send letter, resume, and names of three references to Phillip Wesley, Dean, Educational Resources, California State University Dominguez Hills, Carson, CA 90747. Applications must be received by May 15, 1978. Approximate appointment date: June 1, 1978.

Equal Opportunity/Affirmative Action Employer

position announcements

position announcements

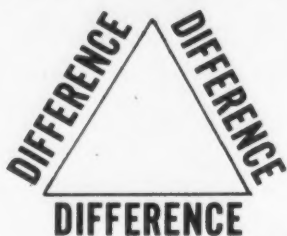
position announcements

position announcements

position announcements

PROGRAMMERS

YOU ARE THE



THE COMPANY IS
CSC

People whose capabilities and accomplishments have contributed to CSC's position of leadership and unequalled record of performance in the information Science Industry.

The company . . . whose imaginative top management, creative and technically innovative professional staff has resulted in growth of over 2,000 percent; and an environment where your future is in your hands. If you're a computer professional with PROGRAMMING, ANALYSIS or SYSTEM DESIGN experience, we want you on our team as we enhance the State-of-the-Art in the following areas:

**MANAGEMENT INFORMATION
SYSTEMS
COMMUNICATIONS
COMMAND & CONTROL
SYSTEMS ENGINEERING
H/W S/W F/W
TACTICAL DATA SYSTEMS
ELECTRONIC SECURITY
AUTOMATED LOGISTICS
WEAPONS SYSTEMS
SUBMARINE SYSTEMS**

Make a change that makes a big difference . . . Join CSC. Your first move is to call collect or send your resume to:

Anne M. Lynch (609) 234-1100

**COMPUTER
SCIENCES
CORPORATION**

Defense Systems Division
P.O. Box N
Moorestown, NJ 08057
Major Offices and Facilities
throughout the World
Equal Opportunity Employer M/F

DIRECTOR of COMPUTER OPERATIONS

Major Philadelphia institution is presently seeking a department head who has proven experience in the management of a large Computer Operations activity.

The ideal candidate will have at least 10 years' experience in the management of a multi-shift operation including a technical background with knowledge of Data Base/Data Communications Systems, virtual operating systems, and S/370 hardware. This person must have the ability to provide strategic planning and direction. Candidate will be a decisive motivator with the ability to direct the training and development of an expanding staff.

Excellent benefits with compensation based on experience. Please send confidential resume and salary history to:

Z-44, Post Office Box 1924
Philadelphia, Pa. 19105
Equal Opportunity Employer M/F

OVERSEAS
ADVENTURE \$40K+

IRAN

Applications programmer, Systems Engineer, H-6000 or L/66, GCOS/COBOL/GMAP IDS TPE/MULTICS, US firm has 18-24 mo tours w/fam. Ex financial pkg in Tehran. Ski 1 hr fm office. Rush resume: Cybermetrics Corp., P.O. Box 579, McLean, VA 22101. (703) 356-1997. Other positions avail. USA and Iran

Computer Center Director

Small college facility; remote station tied into dual processor DEC System 10 at University's Durham campus. MS or MBA; 4-5 yrs data processing exp; 2 yrs supervisory exp. desirable; exp. with DEC System 10, 20 or PDP-11 highly desirable; extensive COBOL exp; familiarity with other programming languages, incl. FORTRAN, BASIC, and administrative & academic data processing. \$16,944-\$26,376. Starting salary dependent on qualifications but would normally not exceed \$19,300. Send resume by May 12, 1978 to Personnel Office, Keene State College, Keene, NH 03431. AA/EEO.

PROGRAMMERS-ANALYSTS-TECHNICAL WRITERS

IS THERE A "BUG" IN YOUR CAREER?

PROCEDURE DIVISION USING OHIO, MICHIGAN, ILLINOIS OKLAHOMA, TEXAS, INDIANA, PENNSYLVANIA. OPEN INPUT YOUR EYES.

START-WITH-ACI.

* READ THIS ADVERTISEMENT

IF NO-ADVANCEMENT OR BORING-JOB

GO TO CONTACT-ACI

IF EXPERIENCED-PROG-ANAL AND WANT-MORE-SALARY

GO TO CONTACT-ACI.

IF DP. DEGREED AND NO-EXPERIENCE

GO TO A-C-I.

CONTACT-ACI.

IF QUALIFIED-APPLICANT

PERFORM CHALLENGING-POSITIONS

PERFORM MONETARY-INCREASES

PERFORM POSITION-ADVANCEMENTS

PERFORM IN-HOUSE-EDUCATION.

A-C-I.

* CALL "AUTOMATION-CONSULTANTS"

USING PHONE-800-543-2285, RECRUITING.

OHIO RESIDENTS CALL (513) 278-4861 COLLECT *

IF NO ANSWER

PERFORM SEND-RESUME

* AUTOMATION CONSULTANTS, INC.

* 1700 NEEDMORE ROAD

* DAYTON OHIO 45414

* ATTN: RECRUITING

IF NO-INTEREST

PERFORM EVALUATE-YOUR POSITION.

PERFORM SHOW-AD-TO-FRIEND.

CLOSE YOUR EYES.

RETURN.

*EQUAL OPPORTUNITY EMPLOYER M/F

aci

CYBERSEARCH

The COMPUTERIZED Employment Service

AMBITIOUS D.P. PROS

Before you sign up with just anyone to help you find a job, ask them if they're computerized CYBERSEARCH* IS!

So you derive all the inherent benefits of SPEED, ACCURACY, CHOICE and less chance of being by-passed!

Your qualifications are instantly available to our experienced consultants, who have career openings they must fill nationally, in all types of companies.

No cost to you, all fees are employer-paid. To protect your identity, your name and present employer's name are not included in our computer data base.

Simply call or write the CYBERSEARCH Office nearest you. CYBERSEARCH WORKS!

Why shouldn't computers help you advance your career... after all, you're in the computer industry.

TS SALES SUPPORT	TO
CUST. SVCE/DP EXP.	\$20K
APP. ANALYSTS/TERM. & PER.	\$18K
COBOL PROG. ANALYSTS	\$25K
SENIOR PGMR.	\$25K
SALES SUPP. ANAL/MINI	\$20K
PROG. ANALYST RX-11	
FTN PROG/RT HP21MX\$22K	\$22K
SR. COBOL PROG. HVY ALC	\$22K
3-5 YRS EXP ON 360/65,	
370/168, OS-MRT	\$23K
SY. ANAL. DES. BIOMED	
SWARE MINIS-SCI DG PTD	\$28K
AND MANY MORE	

For more information, please contact our local office. Ask for the data processing department

CONTROL DATA CYBERSEARCH INC.

a subsidiary of
CONTROL DATA CORPORATION

CHICAGO, IL
214 North Michigan
60601
312-454-8490

IRVINE, CA
17744 Sky Park Boulevard
92714
714-754-7701

PHILADELPHIA, PA
Two Balacynwyd Plaza
19004
215-667-2400

DALLAS, TX
8585 Stemmons Freeway
75247
214-688-5810

LOS ANGELES, CA
8616 La Tijera Boulevard
90045
213-642-2462

SAN JOSE, CA
2025 Gateway Place
95110
408-866-3186

HOUSTON, TX
2000 West Loop South
77027
713-965-5666

MINNEAPOLIS, MN
6800 France Ave. South
55435
612-830-6650

position announcements

position announcements

position announcements

position announcements

position announcements

EDP MANAGER

Prove your skills! Leading consulting & service bureau has challenging assignment. Strong bkgnd. in PDP 11 and database applications. Super oply. \$30-40,000 FEE PAID

ROBERT HALF PERSONNEL AGENCIES

522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

Instructor E.D.P.

Private, four year, liberal arts college in southwestern New Hampshire will have a full time faculty position available on September 1, 1978. Must be familiar with both COBOL and BASIC languages and possess 2 or 3 years industrial or teaching experience. Advanced degree preferred. Submit resume by May 15, 1978 to:

Mr. James Scotland, Chairman
EDP Search Committee
Franklin Pierce College
Rindge, N.H. 03461

Equal Opportunity Employer M/F

OUR STANDARDS ARE HIGH THEY HAVE TO BE

Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

Immediate openings in Miami, Houston, Washington, D.C., and Philadelphia areas. Call collect or send resume with current salary requirements to:

Mr. Fred Trimble

Data Technology Industries, Inc.
6611 Kenilworth Ave., Suite 413
Riverdale, Maryland 20840
(301) 779-8828

TOLL FREE
800/633-6644

In Alabama Call Collect
205/328-2931
24 Hr. Telephone Service

SUNBELT SERVICE

DP Mgr, Data Gen Equip	28K
Bank Software Advisor	26K
PDP-11 Sys Prog	26K
Mfg, 370 OS, P/A	25K
Anal, Mfg, Burroughs	24K
Proj Mgr, Bank, 370	24K
EDP Consult/Big 8	24K
Utility, Anal, 370	22K
Systems Prog, 370	22K
P/A, Mfg, 370, CICS	22K
Finan, NCR, P/A	20K
Sys/3, Mfg, Mgr	20K
Analyst, Mfg, MRP	20K
Tech Prog'r, Assem	20K
EDP Mgr, Mfg, NCR	20K
DP Auditor	20K
Mfg, Prog Anal, 370	20K
Ins, Proj Mgr, 370	19K
Amdahl Prog/Anal	18K
S/3, Mod 15, Mfg, P/A	18K
Prog'r, Eclipse C300	18K
Burroughs 1700, P/A	18K
PL/I Programmer	16K

Representative listing of current southern opportunities. Additional positions available in south and nationwide. All fees paid. Call Ole Olson or mail resume for fast, confidential service.



GENERAL PERSONNEL CORPORATION
Brown Marx Bldg
Birmingham, Ala. 35263

Software Professionals:

This may persuade you to join ADR...

The Company

ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed \$20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

The Products

ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

The Environment

ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

Openings for Systems Software Development

If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software. Experience with online systems (CICS, TSO, etc.) or knowledge of OS internals is a definite plus. If you have participated in the development of any type of software packages — system, utility, or application — we would really like to talk to you.

Openings for Systems Software Support

ADR knows that its products can only be as good as the service we give our customers. If you like dealing with people, enjoy an occasional trip, and have strong communication skills, you might consider a support position at ADR. To qualify, you should have a strong technical background in IBM computers and operating systems, and a college degree. As our product line continues to expand, our product support needs will grow as well. You could be a part of that growth!

This may persuade your family...

**Princeton:**

A Top Ten Town
Princeton is on almost everyone's list of the ten best American communities in which to live. Yet it is surprisingly affordable. It offers not only beauty and serenity but a wide variety of cultural, sporting, and educational activities.

Sports Unlimited

It's been said that Princeton has almost as many tennis courts as people. You can also sail, ice boat, and skate on Lake Carnegie. Or jog to work. Or golf at one of the many courses in the area.

One hour to N.Y. or Philadelphia

You're less than an hour from the shore — a stone's throw from historic Washington's Crossing and New Hope — within easy reach of the New Jersey Turnpike and the Garden State Parkway.

Educational and Cultural Facilities

The home of Princeton University. The Institute for Advanced Studies. Westminster Choir College. and many superior grade and high schools. The McCarter Theatre is in town and the Bucks County Playhouse nearby.

Excellent Housing

You can live next to the old Raritan Canal, on a golf course, or in an old grist mill. Princeton and other beautiful communities nearby can fill your needs for an apartment or home at every price level.

ADR's new home

In the summer of 1979 ADR will be moving to a new 65,000 sq. ft. building on 40 wooded acres in the foothills of the Sourland Mountains. This new site is less than a mile from ADR's current location.

Please send your resume in complete confidence, including current salary and position desired, to:
Director, Software Products Division. Or call 609-921-8550.



APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS™

Route 206 Center, Princeton, N.J. 08540

An Equal Opportunity Employer

CORICO'S SOFTWARE LISTINGS: MASS., NH, ME, VT.

This is a partial listing and we welcome calls from candidates with any applications experience.

PROGRAMMERS	• Cobol, Basic	• \$18K
SR. PROG. ANAL.	• Cobol, Banking	• \$22K
SR. PROG. ANAL.	• Cobol, IMS	• \$25K
	Financial	
SR. SYST. ANAL.	• Honeywell	• \$28K
	Cobol, Mfg.	
SR. SYST. ANAL.	• NH, Cobol, Mfg.	• \$28K

All fees company paid, free resume update. We are available for evening appointments.

CORICO

CORP.

EDP RECRUITERS
1 (603) 893-4511

301 South Broadway
Salem, NH 03079

Call or send resume to Software Group

PHILADELPHIA EDP DIRECTOR TO \$30,000

Total respon for all systems-related activity for prominent PHILA. service corp. Sys design & implementation, programming & operations. Establish procedures & controls for effective user dept interface. Challenging spot reqs exceptional EDP mgmt exp from sm batch environ; SYS 3, hands-on RPG II exp best. Knldg acctg helpful. Career spot w/excel fringes.

For immediate, confidential attention; please call or forward resume to:

ROBERT HALF PERSONNEL AGENCIES

2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 568-4580

Programmers Analysts

Maximize your opportunities...

...take advantage of the most individualized job search available in the D.P. industry today. You pay absolutely NO fee for our service. We search out the best opportunities nationwide to fit your earnings & growth potential with respect to your location requirements. In confidence, send us your resume with present salary & geographic preference. Let us maximize your opportunities.

SEARCH E.D.P., INC. 3152 Linwood Ave. Cinti. Oh. 45208

position announcements

position announcements

position announcements

position announcements

position announcements

CENTURY ANALYSIS IS PEOPLE

Inovative and Progressive People

If You Are Creative and Successful In Your Own Specialty Century Analysis is Interested In You!
Century Analysis is synonymous with:

- Superior Software Tools
- Enthused Solid User Base
- Worldwide Interest and Demand
- Proven Marketing Plans
- Unsurpassed Post-Installation Support
- New Product Research and Development of Unparalleled Scope
- Innovative and Dynamic Organization
- Extremely Rapid Growth

To maintain our rapid, yet controlled expansion rate, we are seeking top-level professionals in various data processing fields.

District Marketing Managers

Are you an above average individual with a degree and a strong management background, combined with a minimum of five years data processing marketing experience? If your answer is to the affirmative, and you feel that your capabilities warrant compensation in the high five figure range, we would appreciate discussing any further mutual possibilities with you.

Instructors

Do you have a degree, a good background in programming and systems development, and previous experience instructing in some phase of data processing? If so, and you would be interested in instructing courses on new software products, some travel, above average compensation and fringe benefits, please forward a copy of your resume.

Marketing Representatives

Do you possess a college degree, and have a minimum of three years experience in data processing sales/marketing, preferably with some experience along software lines? If so, and you are interested in an excellent starting salary, generous commission structure, and fringe benefits, please forward a copy of your resume.

Senior Systems Analyst

Are you the individual who has a strong IBM or NCR background in systems development, and are full of new ideas oriented towards simplifying the development, implementation, and maintenance of custom designed software? If so, we would be very much interested in your resume and further discussions regarding mutual possibilities.

The advantages of growing with Century Analysis:

- Exciting Products (PASS/3)
- Progressive and Open-Minded Environment
- Receptive to your New Ideas
- Travel-Expanding Marketplace (Future plans include Western Europe, Australia, and Japan.)
- Excellent Opportunities for Rapid Advancement to the Level of Your Capabilities.
- Live and Work in California or Atlanta.

Send your resume to:

Personnel Director

CENTURY ANALYSIS INC.

3343 Vincent Road, Pleasant Hill, CA 94523

or call Jerry Lafrance collect at (415) 935-9050 between 9:00 AM and 5:00 PM.

DATA PROCESSING PROFESSIONALS

Senior Analyst/Programmers Analyst/Programmers

CROCKER BANK is a \$13 billion National Commercial Bank, 4th largest in the State of California, 12th in the U.S. As frontrunners in the Banking Industry, Crocker is committed to developing advanced systems. Continuous growth and success has created the need for additional DP Professionals, for the utilization of IMS data base technologies in a Banking environment.

Function as a member of a Computer Systems Project Team. Positions require in-depth skills in computer systems design, programming and implementation, plus experience in large scale IBM OS, COBOL environments. Skills with TSO, HIPO and structured programming highly desirable. Knowledge of large scale business systems necessary. Financial applications development in a data base, transaction driven, multi-user environment desired. Good communications skills desired.

Positions also available working with Crocker Time Sharing Service Run on Digital PDP 11/70 equipment using RSTS and BASIC. Experience with time sharing industry desirable.

We offer outstanding salaries, exceptional benefits and a stimulating, technical environment. We also offer relocation assistance to assure that our search will attract the finest of Professionals.

Please send resume, including salary history and requirements to Sherron Sullivan, Senior Employment Representative, Crocker Bank, Operations Division, P.O. Box 38012, San Francisco, CA 94138. Individuals only apply.

An equal opportunity employer



HOUSTON

The .P. market here is terrific. It would be impossible to list all of our available positions (over 300), but here is just a sample:

Energy	
T.P. Specialist	\$18-24K
Analyst	18-24K
Scientific Progs	16-24K
Analyst	20-26K
Systems Prog	18-22K
COBOL P/A	15-19K
Inquiry Anal	15-17K
Systems Prog	18-20K
Control Mgr	25-40K
DBA	18-30K
T.P. Analyst	18-30K
Prog Analyst	15-28K
Planning Anal	18-22K
Hardware Anal	18-22K

Manufacturing	
Proj Ldr-Sys/3	18-20K
Prog Analyst	18-21K
Analyst	18-22K
Project Ldr	20-25K
Prog Analyst	18-20K
Systems Prog	18-22K
IMS Prog Anal	17-20K
DBA	18-22K
OS COBOL P/A	14-18K
CICS P/A	16-20K
Analyst	18-22K
Programmer	15-16K

Financial	
CPCS Prog Anal	18-24K+
Operations Mgr	20-25K
Prog Analyst	18-20K
Analyst	17-18K
Tech. Sup. Trainee	14-18K
Systems Prog	21-23K
Tech. Support Mgr	22-26K
DOS Prog Anal	16-19K
Project Ldr	24-26K
Systems Prog	21-25K
Operations Anal	19-25K
IMS/CIF	18-20K
DB Analyst	22-26K
E.D.P. Auditor	18-23K
Mgr. - Sys & Prog	20-25K

To be considered for one or more of these positions, send your resume to:

Jim Fleming
ROBERT HALF
PERSONNEL AGENCIES
4801 Woodway
Houston, TX. 77056
or call (713) 961-3271

Finance Systems Marketing Systems Applications Support

OPPORTUNITY, CHALLENGE, GROWTH FOR PROGRAMMER ANALYSTS

Our Management Information Systems staff continues to seek quality systems professionals to join our Corporate headquarters in Phoenix. As a leading consumer goods company, we need top MIS personnel to support the manufacturing and marketing of products such as Dial soap, Tone soap and Armour-Star canned meats.

Our specific needs are in:

- Financial applications-requires 3+ years experience in general ledger, payroll, accounting and financial planning. BS/BA in accounting, business, or computer science desirable.
- Manufacturing Systems-requires 2+ years experience in inventory control, MRP, cost accounting. BS/BA required.
- Applications Support-2 years experience, BS/BA required. Provides on-going support, maintenance and enhancement of existing systems.

These opportunities require heavy experience with large scale IBM equipment in an OS environment using COBOL. TOTAL DBMS a definite plus. Heavy user interface makes excellent communication skills essential.

If you are seeking an opportunity to grow as an MIS professional in an environment that encourages new ideas, send us your resume. Tell us what you've done, your career objectives and salary requirements.

John Marques Jr., Personnel Department

ARMOUR-DIAL COMPANY

111 W. Clarendon

Phoenix, AZ 85077

An Equal Opportunity Employer - M F

position announcements

position announcements

position announcements

position announcements

position announcements

DATA BASE ANALYSTTo \$24,000
(Fee Paid)

Our client is looking for a Data Base Analyst with experience. This person should be familiar with IBM 370/OS, D.B.D.C. and IMS.

ROBERT HALF PERSONNEL AGENCIES

3379 Peachtree Rd. N.E.
Atlanta, Ga. 30326
(404) 266-2153

DATA PROCESSING PROFESSIONALS**PROGRAMMER/ANALYSTS**

(Need 7)

To \$20,000 Range

Leading international corporation based in Memphis, TN needs DP professionals for expanding information systems operations. Prefer experience encompassing 2 or more of the following: IBM 360/370, Environ 1, teleprocessing, Basic, APL, SAS, Fortran IV, TSO, Cobol, OS and total data base systems. Related background will allow close consideration.

SYSTEMS ANALYSTS

(Need 30)

\$17,000 to \$24,000 Range
\$3 billion dollar multi service corporation needs qualified systems analysts for major expansion. Vast and diversified DP backgrounds will be utilized. Prefer 2 or more of the following: IBM 370, OS/MVT, OS/MVS, DOS, ANS Cobol, ALC, Fortran, JCL, design, programming and implementation of business and financial systems. Outstanding benefits and career opportunity.

ALL FEES PAID

Send Resume or

Contact Jim Morgan

EXECUTIVE PERSONNEL CONSULTANTS

5050 Poplar Ave. Ste. 1601
Memphis, TN 38157
(901) 761-4560

ENGINEERING ANALYST PROGRAMMER

Southern California utility is seeking an individual with experience on REAL-TIME PROCESS CONTROL and interrupt-driven computers for development of an energy management system. Individual should have experience in real-time advanced power system applications such as load flow, state estimation, security analysis, Power flow and Bus load forecasting. Position requires a Bachelor's degree or equivalent, preferably in computer science, engineering or mathematics. Candidates must have knowledge of assembler and Fortran programming languages and real-time process control computer systems. Send resume and salary requirement to:

Employment Office

SAN DIEGO GAS & ELECTRIC CO.

P.O. Box 1831
San Diego, CA 92112
An Affirmative Action and
An Equal Opportunity Employer

SOFTWARE ENGINEER PROJECT ENGINEER

Top level design people needed to design and supervise the development of real-time industrial control systems for material handling, automotive, and metals industry applications. 3-5 years experience required. Applicants should have real-time process control experience - D.E.C. or G.A. minicomputer experience desirable.

Top salary commensurate with experience, liberal benefits package, and a rural southeast Michigan location. Send resume and salary requirements in confidence to Employment Manager at:

CUTLER-HAMMER, INC.
9475 Center Rd., Fenton, MI 48430
An Equal Opportunity Employer M/F

SR. PROGRAMMER ANALYST

Senior level position open due to promotion. Must be presently involved in heavy analysis of mfg. & fin'l. systems. Reports directly to mgr. of systems & programming. Light COBOL programming required.
\$20,000. (Fee paid).

ROBERT HALF PERSONNEL AGENCIES

1310 Liberty Bank Building
Buffalo, N.Y. 14202
716-842-0801

SOFTWARE SALES Northeast

We have been retained by one of the leading software development firms in the country to locate a number of sales personnel. Experience selling database, telecommunication, audit, information retrieval, and language packages a must. Prior technical experience very helpful. Salary plus commissions. Initially \$25,000-\$30,000. High earnings potential.

3780 Whitney Ave.
Hamden, Ct. 06518
(203) 288-7461

BREEN DATA

Division of the Breen Group, Inc.

For further information regarding these opportunities, please call or write in confidence Toby S. Brimberg.

NEW TECHNOLOGY IS CHANGING THE WAY THE WORLD COMMUNICATES...**Join the team that's making it happen!!****CALL TOLL FREE****(800) 323-1966****In Illinois (800) 942-0491****Monday thru Friday from 8am to 5pm cst**

The future is happening NOW at GTE Automatic Electric Laboratories, and its happening in a big way. We're working on new techniques and systems that will drastically change the telephony control and transmission process in the decades ahead. If you would like to be one of the contributors to a new era in computer application, and a new level of the telecommunications science, talk with us.

APPLIED RESEARCH

Performs research on circuits, systems and subsystems and related hardware and software in order to provide management with information on concept feasibility and estimated system cost for design and development. Efforts involve providing existing services with new techniques and/or new services on existing equipment.

LONG RANGE PLANNING

Long Range Planning activities involve research studies on a wide variety of subjects related to the telephone communications industry. These studies include such areas as data communications, new technology, new services, future switching networks, evaluation of new switching techniques and review of the impact of political, economic and regulatory considerations. Intent is to provide well founded counsel and recommendations to upper management on future development programs and courses of action.

SYSTEMS DESIGN

New Feature Design—Plan and develop the future hardware and software evolution of current large scale fully stored program controlled switching systems. Develop new features for existing equipment, study new features impact on existing systems, and estimate the development costs and requirements.

Product Design—Design advanced fully stored program controlled systems for telecommunication application. Develop large scale software programs in an on-line, real-time environment and related digital hardware using CMOS, Schottky, TTL as well as Static and Dynamic MOS.

International Design—Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development and detailed studies of critical problem areas. Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad.

SOFTWARE DESIGN

Data Base Software—Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems in an IBM 370 environment using PL/1.

Support Software—Involved in compiler, assembler, simulator maintenance and enhancement as well as other IBM 370 software developments. Support effort is related to micro and large processor developments.

Application Software—Large scale development in telephone system real-time control. Diagnostic and fault recognition software, administrative software involving real-time data base administration, switch and network overload procedures as well as executive software.

SYSTEMS CONTROL AND TESTING

Development and execution of comprehensive test plans to evaluate the performance of large stored program switching system prototypes. Execute configuration management on all hardware, software, and components and maintain project control for all activities. System evaluation performed on both laboratory prototypes and initial field site locations.

If you have in-depth expertise in one or more of these areas, and a BS, MS, or PhD in Electrical Engineering, Computer Science, Math or other appropriate engineering discipline as well as an interest in moving forward with challenging new frontier in computer technology, talk with us.

If unable to call send resume including recent salary history to:

Manager of Technical Employment
Dept. 471 A8

GTE**AUTOMATIC ELECTRIC LABORATORIES**

400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M/F

MAKE THE SWITCH

position announcements

position announcements

position announcements

position announcements

position announcements

SYSTEMS ANALYSTS (DATA PROCESSING)

We are one of the largest teaching and research medical facilities in the Midwest, currently seeking several Systems Analysts for our Systems and Procedures Department.

To qualify, you should have at least 5 years experience in programming at the Senior Programmer/Analyst or Systems Analyst level, and have a thorough, state-of-the-art knowledge of COBOL (a second language is highly desirable); OS-JCL, Utilities, Operating Systems, Sort-Merge, and CICS. You must have had previous responsibility for at least one major project from inception to completion. Experience in the design, programming, and implementation of on-line systems is helpful but not mandatory. You should be familiar with concepts of packaged software (preferably MSA) and possess good analytical skills and judgment. In all respects, the applicant we seek must be a professional.

If selected, you will be responsible for the installation of packaged financial software, the design, programming, installation and debugging of programs, analyzing program or system problems, investigating software programming aids or tools, and setting up standardized procedures. You will report directly to the Manager of Systems and Procedures and be assignable on a consultant basis to special projects. You must have strong managerial skills, as you will supervise Programmer/Analysts in the programming of large or complex systems.

We offer qualified individuals an excellent salary and comprehensive fringe benefits package that includes paid relocation and tuition reimbursement. For consideration, please send resume, including salary history and requirements to:

David J. Kinsella
Manager, Employment

MICHAEL REESE HOSPITAL & MEDICAL CENTER

29th and Ellis Ave. Chicago, IL 60616
An Equal Opportunity/Affirmative Action Employer M/F

Information System/ Data Processing Director

Corporate and worldwide
MIS responsibility
Salary \$50,000 plus

We're a major force in our industry, international in scope, diversified in technology and highly aggressive in our MIS function. We're looking for an accomplished individual, skilled in leadership, dedicated to performance and meeting company wide growth goals.

The management responsibilities of this key position are substantial, encompassing the development and implementation of policies, practices, procedures and standards related to information systems and data processing services for corporate and worldwide operations.

Primary responsibilities will be in the coordination and effective utilization of business, manufacturing, marketing, distribution and computer systems. Position requires 10 or more years of industrial experience, including 5 at the management level with a wide range of diversified EDP equipment. International experience is highly desirable as well as some experience in a large CPA firm. MBA or CPA preferred.

Position reports to the Vice President of Finance and is based in a northern Chicago suburb. Salary commensurate with background plus complete benefits. For prompt and confidential consideration send a letter or resume including salary history to:

CW Box 1550
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer M/F

SENIOR SYSTEMS INSTRUCTOR

CMC, a division of Pertec Computer Corporation, has a challenging opportunity for a highly motivated and qualified individual as a Senior Systems Instructor in the Corporate Education Center. Reporting to the Systems Education Manager, this individual will have responsibility for developing and teaching courses for sales and systems personnel in various product related and other data processing applications.

The ideal candidate will have previous experience with a manufacturer of computer products and must possess excellent classroom and communications skills, knowledge of COBOL essential, as well as exposure in two or more of the following:

- Sales or marketing of computer products
- Field experience in systems support
- RPG II and/or BASIC programming
- Assembly language programming
- Data communications
- Development of computer related course curriculum

We offer outstanding compensation and benefits which include profit sharing/retirement plan, stock purchase plan, medical, dental and life insurance and up to 25½ paid days off per year. Qualified candidates are invited to submit their resumes, including salary history, or phone:

J.T. Shenchen
(213) 822-9914, Ext. 601
P.O. Box 92300

Los Angeles, California 90009
An Equal Opportunity Employer M/F

PCC PERTEC
COMPUTER
CORPORATION
CMC Division

DATA PROCESSING

Hooker Chemical Company, a world leader in the chemical industry, is seeking data processing professionals interested in careers at good salaries within our Grand Island, New York Corporate Data Processing Department. The company offers excellent benefits and a full range of career-path positions within MIS.

PROGRAMMER/ANALYST

Seeking competent individuals with 2-4 years CICS Software and Application experience. Must have participated in the design of CICS System. VSAM knowledge is a plus.

Responsibilities include system analysis and programming. Applicants must be aggressive, self-motivated and have ability to communicate with user management. Requires, in addition to the above technical requirements, a working knowledge of COBOL and a two year college degree or its equivalent in training and experience. Knowledge of IBM 370 O/S, JCL and utilities desirable.

Previous experience with manufacturing applications a definite plus. Opportunity is open to progress through project leadership positions based upon the individual's performance.

Send resumes and salary history to:

Edward G. Weiser, Professional Recruiting Representative
Hooker Chemical Company
P.O. Box 728, Niagara Falls, NY 14302
An Equal Opportunity Employer M/F

hooker
Subsidiary of Hooker Chemical Corporation



is a systems development firm, established in the East and emerging in the Southwest. Professional staff positions are available in Northern Virginia and Texas.



is seeking experienced challenge-oriented ADP professionals with accounting, data base and management applications expertise on large-scale computer systems; energy industry experience a plus.



is offering unique opportunities and competitive salary to outstanding candidates seeking to grow professionally in a system development or management consulting environment.

Send your resume with salary history in strict confidence to:



Professional Personnel-CW
Suite 306, 1911 N. Ft. Myer Dr.
Arlington, Virginia 22209

An Equal Opportunity Employer

SYSTEMS ANALYSTS/SENIOR PROGRAMMERS

position announcements

position announcements

position announcements

position announcements

position announcements

**SR. PROG.
ANALYST**

Conn. Corp. expanding dev. of lge. scale IBM/MVS systems. Indiv. with COBOL bkgd. has excellent oppty. to grow with state-of-the-art DB/DC systems. Pro. environment w/continual technical training. Starting salary to \$23,000. (Fee Paid). Contact: Stan Durbas

**ROBERT HALF
PERSONNEL AGENCIES**

111 Pearl St.
Hartford, Conn.
(203) 278-7170

FIELD SERVICE

SYSTEMS 370/360, H-200, XDS, Univac, CDC All Large & Medium CPU's

MINI's PDP, NOVA, G.A., HP, etc. All Mini Systems

I/O STC, TELEX, CDC, ITCL, CALCOMP, etc. All Peripheral Experience

MTA

(312) 344-6750

MTA ASSOCIATES
1107 Mannheim Road \$12-30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

**DATA BASE
ADMINISTRATOR
LOUISIANA STATE
UNIVERSITY**

Minimum Qualifications: College graduate with at least five years of data processing experience, two years of which must be in data base design or administration. Preference given to experience in IMS, DL1, DC, and large systems. Successful candidate will control data base activities at LSU and will supervise the activities of one junior DBA. The salary is very competitive with a 3033 support computer. Send confidential resume to:

Dr. John M. Tyler
System Network
Computer Center
Louisiana State University
Baton Rouge, LA 70803

An Equal Opportunity
Affirmative Action Employer

West

Los Angeles Area

San Francisco Bay Area

Seattle

Denver

Kansas City

Minneapolis/
St. Paul

Chicago

St. Louis

Shreveport

San Antonio

Houston

Dallas

Albuquerque

El Paso

Milwaukee

**"Had it" with
those ordinary
sales jobs?****Good. You're ready
for Tektronix.**

Our present growth has been brought about by professionals like yourself, people who have been trained to do a good job; you like the sales field and want to progress. At Tektronix you'll have the best product in the marketplace to represent AND have complete management and sales support. We say 'complete' support and we mean it. Our sales staff is very important to us, as are all of our people. That's why we attract, and keep, the best professional sales staff in the industry.

That's where you come in. If you have the training and ability, but need a company where you can really put them to work, knowing you'll have support when and where you need it, then you're ready for a Tektronix career. You'll be representing the undisputed leader in computer graphic terminals and computer graphic systems: From manufacturing to marketing to servicing. Our growth has created openings in major metropolitan areas across the nation for the following:

**District Sales Managers
OEM Sales Engineers
Sales Engineers
Systems Analysts**

Let's get together—NOW.

(800) 227-8340 Outside California

(800) 638-1915 Inside California

If you are ready to put your talents to work, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to Tod Sorensen, TEKTRONIX, INC., 3200 Coronado Drive, Santa Clara, California 95051. An equal opportunity employer m/f/h.

Coming to National Computer Conference? Call us now, let us know when and where you'll be and we'll schedule and interview at your convenience.



Tektronix
COMMITTED TO EXCELLENCE

East

Rochester, N.Y.

Syracuse, N.Y.

Philadelphia

Charleston, W.VA

Richmond, VA.

Baltimore

Washington, D.C.

Detroit

Boston

Rhode Island

Springfield, N.Y.

New York, N.Y.

Cleveland

Atlanta

Orlando

Memphis

Louisville

Columbia, S.C.

Birmingham

**JOIN
AMERICAN
EXPRESS...**

...A company whose past and future growth is based on a history of innovation. Our Phoenix Arizona facility is the focal point for several far reaching data processing and data communications projects. We are looking for experts whose leadership and technical knowledge we can challenge. Opportunities include:

MANAGER OF PRODUCTION CONTROL

Requires a basic knowledge of business administrative computer fundamentals and a thorough knowledge of Data Processing-Data Preparations file interdependency and job flow. Specific experience in supervising job set-up, work flow control, Tape Library activities and production scheduling. Experience must be with IBM 370/MVS operating systems, knowledge of job control language and exposure to IMS-based systems. This is a 3-shift department consisting of 50 people both technical and nontechnical.

SYSTEMS PROGRAMMER

Requires systems software implementation and modification experience, proficiency in machine language, input-output channel programming and IBM access methods. Specifically needed is knowledge in on-line interactive software packages, MVS, JES2, VTAM, and/or VM/370, and experience in performance monitoring and tuning.

PROGRAMMERS & ANALYSTS

Programmers and Analysts experienced in IBM assembler language in an OS or PARS, ACP environment.

We offer an outstanding compensation package which includes generous fringe benefits. For more information, CALL COLLECT to Pat Kriegsfeld, or send your resume to:

American Express Co.

P.O. Box 13781
Phoenix, Arizona 85002
602/248-1733

We are an Equal Opportunity Employer M/F

**AMERICAN
EXPRESS****SR. PROGRAMMER
ANALYST**

Share responsibility for development of an on-line manufacturing system.

3-5 yrs. experience with RPG II and COBOL.

Experience with on-line systems, CCP manufacturing, S/3-15D, BOMP, a plus.

Competitive salary, excellent fringes. Must locate in northern New Hampshire.

Send resume to:
Gil Patry

Brown Company

650 Main St.
Berlin, N.H. 03570

An Equal Opportunity Employer M-F

**COMPUTER
SERVICE
COORDINATOR**

Pomona Unified School District (California) invites applications for the position of **COMPUTER SERVICES COORDINATOR**. Submit vita by April 24th to Fay Mason, Personnel Assistant, Pomona Unified School District, 800 S. Garey Ave., Pomona, Ca. 91711.

**AN AFFIRMATIVE
ACTION EMPLOYER FOR
ALL MEN AND WOMEN**

**THE
WAYNE HAMMOND
AGENCY**

Executive Placement Service
and Contingency Search
Specialists in
Data Processing

"The Nation's Most Respected
Executive Personnel Service"
Ask Our Clients Why

533 Airport Boulevard, Suite 500
Burlingame, California 94010
At S.F. Intl. Airport (415) 348-1535

Programmer

Sperry Flight Systems is the Phoenix based international leader in automatic Flight Control Systems and Avionics for aircraft and space vehicles.

Currently we need a professional in our Information Systems Division.

Univac**SYSTEMS
SOFTWARE
Programmer**

Senior Systems Programmer responsible for Univac 1100 series executive SYSTEM "EXEC" using Univac assembler language or "PLUS". We require a degree plus 2 years of experience with Univac Systems Software.

Our system is a new large scale Univac 1100-40.

Our Information Systems environment offers an atmosphere for professional development in a growing organization.

Peripherals include medical and dental insurance, tuition refund and a stock plan.

For further information please send a resume including salary information to Charles E. Melker, Professional Placement at:

**SPERRY
FLIGHT SYSTEMS**
P.O. Box 21114
Phoenix, Arizona 85036
Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

Corporate Staff MANAGEMENT INFORMATION SYSTEMS Florida Location

Harris, a Fortune 500 Corporation, has established a new facility in Melbourne, Florida, for corporate MIS operations. This provides an outstanding opportunity for career growth and recognition for creative, proven, results oriented professionals.

We are looking for qualified individuals who will be key participants in integrating the MIS function with the long range plans of the Corporation. Broad knowledge of business operations, hardware, software, communications networks, and operations analysis is required. Candidates must be able to work with all levels of management and have potential for advancement to an executive position in MIS or Operating Management. Background with electronic or related industries is desirable.

CUSTOMER SERVICES COORDINATOR

User oriented individual required to assist decentralized divisions in effective use of the Corporate Information Processing Facilities. Specific responsibilities include resolution of customer problems, analyzing job stream requirements, work flow scheduling, and general assistance to customers with design and analysis of data base systems. Position requires at least three years of experience in business systems analysis and programming (COBOL, expertise in O/S JCL, strong communicative skills), prefer manufacturing systems experience.

Please send resume with salary history in confidence to: R.W. Underhill, Harris Corporation, P.O. Box 430, Melbourne, Florida 32901.



An Equal Opportunity Employer—Male and Female

EDP SPECIALISTS

Due to company wide expansion, FLYING TIGERS, the world's largest air freight airline, is seeking two individuals for positions in our Computer Services Department.

SYSTEMS PROGRAMMER

Will work in SYSGEN in addition to installing other systems and programs. 1-3 years Systems Programming background with OS MVT is necessary. Experience with HASP desirable.

ACP SYSTEMS SUPPORT PROGRAMMER

Provide technical and programming support to Airline Control Program (ACP), central Site Hardware and Teleprocessing Network. 2-5 years Assembly Language programming under ACP in Control Program Area.

We offer competitive salaries and excellent benefits! Commercial airfare discounts for employee and family are part of the package. If you're interested in being a part of the expanding air-cargo industry, submit resume detailing salary history to:

Personnel Specialist
Data Processing

FLYING TIGERS

7401 World Way West
Los Angeles, CA 90009

Equal Opportunity Employer M/F

COLORADO

Computer Science Professionals

The Solar Energy Research Institute, located in Golden, Colorado is a private research institute charged with expediting commercial applications of solar energy.

To meet this responsibility, SERI is seeking programmers and analysts to assist in the development of a comprehensive solar energy information bank. Successful candidates will have designed and/or implemented on-line information data base applications utilizing relational or inverted file DBMS's such as: ADABAS, BASIS, SPIRES, or SYSTEM 2000.

Opportunities also exist for analytical applications programmer/analysts, communication analysts and systems administrators. These positions require an appropriate Bachelors degree and relevant experience in a technical or scientific atmosphere.

SERI offers competitive salaries and excellent benefits, including dental coverage and relocation assistance.

For immediate consideration, send a detailed resume (no phone calls) including salary history and professional references to:

Mr. J.J. Yacovella, Personnel Services

THE SOLAR ENERGY RESEARCH INSTITUTE

A Division of Midwest Research Institute
1536 Cole Blvd., Golden, Colorado 80401
We are an equal opportunity employer M/F

Realtime Systems PROGRAMMER ANALYST Pharmaceutical Research

This career opportunity has the following specifications:

REQUIRED:

1. Degree in Engineering or Computer Science
2. Expert knowledge of PDP-11 including RSX-11M operating system
3. 3 or more years experience in Realtime system design and programming

DESIRABLE:

1. Knowledge of data communications hardware and software
2. Applications experience in chemical or medical lab automation, or industrial process control

In addition to the real opportunity this position offers in medical research, there are additional considerations: a creative atmosphere in which to work, liberal benefits and easily accessible suburban location.

Send resume to: Manager of Scientific Employment, Research Center, Schering-Plough Corporation, 60 Orange Street, Bloomfield, New Jersey 07003.



Schering-Plough

We Are An Equal Opportunity Employer M/F

Sr. Manufacturing Executive

Mini-Micro Computer Technology

We are conducting an international search for a top notch manufacturing/production specialist to head up a major multi-plant expansion of an international Canadian based corporation.

Candidates will possess a broad background in all facets of high volume process lines of electronic related products. Responsibility for implementing new and innovative techniques into the planning, management, control, assembly and testing functions of a major manufacturing facility is the job scope.

Initially operating in a staff function reporting to the President's committee, this individual will build a "process specialties group" within the organization; the next step is Vice President, Manufacturing.

This opportunity will be of interest to professionals earning in excess of \$35,000.00. Attractive benefits and relocation are offered. Interviews are currently being arranged in the U.S. and Canada. Contact:

D.W. Still, Vice President

**james/still
group**

4467 St. Catherine St. W.
Westmount, Quebec
514-913-0795

INTERNATIONAL INFORMATION SYSTEMS PLANNER

Spanish and English Required
Base Salary \$30,000 Plus Stock and Bonus

We are the exclusive representatives for this Fortune 500 IBM user Consumer Product Manufacturing Corporation. We have been asked to locate an individual who will visit and review DP operations and systems within fifteen foreign affiliates worldwide; develop and maintain profiles regarding DP equipment, plans, systems and budgets; work with international staff in developing standard application. Candidate must have international community experience as a planner or systems manager. Position requires 40% travel.



Please forward resumes only including salary history.

3780 Whitney Ave.
Hamden, Ct. 06518
(203) 288-7461

Paid travel and relocation expenses. Our clients are equal opportunity employers. Call or write in confidence, Toby S. Brimberg

BREEN DATA

Division of the Breen Group Inc.

position announcements

position announcements

position announcements

position announcements

position announcements

Computer Professionals... where in America can you find the real "stars" in computer career advancement? ... You just found them! Each N.C.A. firm was selected for membership because it is the finest professional firm in its area. For stellar performance in helping you to get the position you want... well you can't do better than to use the best. Contact the N.C.A. "star" firm nearest to you and expect your career to soar.



National Computer Associates

CHICAGO
Thomas Hirtz and Associates, Inc.
150 W. Wacker Drive, Suite 1700
Chicago, Illinois 60606
Telephone (312) 236-5075

DALLAS
DataPro Personnel Consultants
4255 L.B.J. Freeway
Suite 162
Dallas, Texas 75234
Telephone (214) 881-8600

DETROIT
Electronic Systems Personnel
Prudential Tower Center
3000 Town Center, Suite 2580
Southfield, Michigan 48075
Telephone (313) 353-5580

FLORIDA
Data Sciences Personnel, Inc.
Suite 205, 15490 N.W. 7th Ave.
Miami, Florida 33169
Telephone (305) 665-7891

HARTFORD
Connors, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105
Telephone (203) 549-4240

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd.
Los Angeles, California 90010
Telephone (213) 487-0816

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
501 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402
Telephone (612) 338-6714

NEW JERSEY
Systems Search II
P.O. Box 6888
South Orange, N.J. 07079
Telephone (201) 761-4400

NEW YORK
Boral Associates, Inc.
405 Lexington Avenue
New York, New York 10017
Telephone (212) 687-0906

NORTH CAROLINA
TestForce, Inc.
1048 E. Wendover Ave.
P.O. Box 6888
Greensboro, N. Carolina 27405
Telephone (919) 373-1461

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa. 18086
Telephone (215) 585-2920

PITTSBURGH
Electronic Systems Personnel
106 Levee Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15219
Telephone (412) 381-6450

SAN FRANCISCO
The Computer Resources Group
Agency, Inc.
353 Sacramento Street
San Francisco, California 94111
Telephone (415) 398-3535

SYRACUSE
CFA Associates Personnel, Inc.
(Agency)
2530 James Street
Syracuse, New York 13208
Telephone (315) 463-5225

WASHINGTON, D.C.
ESP Systems Corporation
Suite 210
1211 Connecticut Avenue N.W.
Washington, D.C. 20036
Telephone (202) 833-8040

EDP INDUSTRY SPECIALISTS

COAST TO COAST OPPORTUNITIES

If your background is in IBM Systems, IBM plug-compatibles or equivalent, career opportunities are available at all experience levels for:

Hardware Specialists
Field Engineers
Technical Writers
Test Technicians
Communications Specialists

Project Managers
Programmer/Analysts
Systems Engineers
Software Specialists
Systems Programmers

Design Programmers
Microprogrammers
Telecommunications Specialists
Marketing Representatives

With over 30 aggregate years experience in the Computer/Electronics Industry, Lee Hallgren and Scott Long realize the critical nature of finding you the right job--the job that will strengthen your career as well as bring you peace of mind. So we place our emphasis on finding the right job with the right firm for the right individual.

We're in the heart of the nation's technological wonderland--San Francisco Bay Area's Santa Clara Valley. A beautiful place to live, to work, and to grow. And we also have a tap on scores of solid career opportunities in several metropolitan areas throughout the nation.

Our clients are among the most reputable firms in the industry. They're the kind of companies that recognize true talent and know that keeping talented people around means more than just top salaries and benefits. It also means providing a place where your career can grow and your personal well-being can prosper.

If you're ready to boost your career with the job YOU want, call or send your resume with salary history and requirements today. And, if you have a chance, write us a letter, too. We'd like to know where you've been and where you'd like to go. Hallgren-Long Associates, 1670 S. Amphlett Blvd., Suite 214, San Mateo, California, 94402, (415) 574-7404.

HALLGREN-LONG ASSOCIATES

HONEYWELL 6000 SYSTEMS PROGRAMMER

Unique Opportunity For Top Notch
Honeywell 6000 Systems Programmer...

Control Data's Peripheral Systems Group is seeking the right individual for systems software development utilizing a new peripheral in a large scale systems environment.

REQUIREMENTS:

Position requires 3 years of more experience in H-6000 systems programming, thorough knowledge of GCOS, GMAP, File Structures, I/O Level debugging, SCF, and master mode dump analysis is required. Knowledge of UFAS is desirable. Must possess good communications skills. Experience with structured methods is desirable.

THE JOB:

Key technical member of Control Data's growing OEM software development group. Individual selected will be heavily involved in design review and GMAP implementation activities. Emphasis on technical problems analysis and solution. Excellent opportunity to advance technical career.

If you desire a challenge and have the credentials, contact us today. Salary commensurate with experience, to \$35k. We offer a liberal compensation and benefit package.

CD CONTROL DATA CORPORATION

Peggy L. Bernhardt
PERIPHERAL SYSTEMS GROUP
2200 Berkshire Lane
Minneapolis, Minnesota 55441
(612) 553-4720

An Affirmative Action Employer M/F

PROGRAMMERS

For the most individualized job search offered in the Data Processing field today, on a local or national level, Send resume to:

SEARCH E.D.P., INC.

Personnel Consultants
13773 N. Central Expwy.
Suite 1305
Dallas, TX 75243

ALL FEES PAID BY EMPLOYER

YOUR IDEAS CAN MAKE MONEY

If you have an IDEA that can be implemented through computers, WE can develop and MARKET it. Genius generates many ideas, but successful ideas are those that HAPPEN.

WE CAN MAKE IT HAPPEN!

Please submit summaries in confidence to:

AMD CONSULTING, LTD.

68-24 Groton Street
Forest Hills, New York 11375

SYSTEMS ENGINEER

Mini Computers -
Vendor Representative

\$18,000-\$22,000

Exeter Associates
Executive Recruiters

Bruce A. Montville
P.O. Box 623
Computer Park
Hampton, N.H. 03842
(603) 926-6712

SENIOR BUSINESS PROGRAMMER

BECHTEL, an international leader in the field of engineering and construction management, has excellent opportunities for a Senior Business Programmer who will:

- Create plans and estimates for the development and modification of financial and administrative systems in support of Bechtel's Accounting organization;
- Work directly with user personnel in definition of problems, identification of alternative solutions;
- Be responsible for assisting in the writing of specifications, procedures, and efficient and accurate coding along with testing of program changes.

Candidates should have at least 5 years' experience in computer applications development. Background in financial/accounting systems and COBOL programming a must. Experience with UNIVAC computers or in a UNIVAC installation desirable.

Interested candidates should rush their resume including salary history to:

K. David Bates
Professional Staffing,
Employment Dept. 15-9-8
P.O. Box 3965
San Francisco,
CA 94119

an equal opportunity employer m/f



position announcements

position announcements

position announcements

position announcements

position announcements

PROGRAMMER/ANALYSTS ARE YOU BETTER? WE ARE!

Decision Consultants, Inc. believes in providing the best services to our clients.

To do that, we need the Best People.

To get the best people, we have to be the Best Company.

And, we believe WE ARE.

So if you are Better, and want to:

- Help us provide the best services,
- Work in dynamic environments,
- Be compensated for your contributions (through outstanding salaries and benefits),

and have 3-5 years experience (degree a plus), in IBM COBOL with CICS or IMS (DL/1), call (COLLECT) or send a resume to:

John O. Haack, Vice President
(312) 693-2810

Suite 401, 9575 Higgins Road
Rosemont, IL 60018

An Equal Opportunity Employer M/F

decision consultants inc.
detroit
chicago

DIRECTOR DATA PROCESSING

Responsible for development, implementation, and management of comprehensive system. Installed IBM 370-138 is operating under DOS-VS in a Cobol environment, CICS-VS with local and remote terminals, also supporting coursewriter and the basic language for problem solving at the school level. Bachelor's degree or equivalent in experience, plus five years training and experience in related fields. Position available 6/19/78. Salary commensurate with experience. Send letter of application and resume to Personnel Department, Racine Unified School District, 2220 Northwestern Ave., Racine, WI 53404 no later than May 12, 1978.

An equal opportunity employer M/F

DIRECTOR COMPUTER SERVICES MANAGER SYSTEMS AND PROCEDURES Methods and Procedures Analysts COMPUTER SYSTEMS AND PROGRAMMING SUPERVISOR Systems Programmer Documentation Specialist

Relocate in the heart of scenic Sierra Nevada, close to skiing, water sports, hunting, fishing and camping areas. Experience the stimulation of a healthy, smog-free life, near the excitement of top name entertainment.

We are one of Nevada's largest employers, a leader in the growing leisure-time business, practice modern management methods and place heavy emphasis on good employee relations. Our record of growth, profitability and stability is outstanding and several major new facility expansions are now underway and will continue well into the 1980's.

Major expansion plans with new locations and a heavy emphasis on data processing have created openings which offer rewarding professional growth opportunities, excellent salary and benefits.

DIRECTOR COMPUTER SERVICES - Company-wide multi location responsibility for all facets of a dual-computer (IBM 370 Model 138's) 24 hour operation with significant continuing growth. We use CICS with over 100 terminals in a variety of complex and challenging application areas. Must have extensive systems, programming and operations background with demonstrated management ability, 10 or more years in progressively more responsible Data Processing positions. Will work with Management to develop a capable and responsive development staff with comprehensive systems and effective controls throughout. Must be an excellent communicator and work well at all levels of management. Extremely attractive benefits for the right candidate.

MANAGER SYSTEMS AND PROCEDURES - Will staff and develop a significantly expanded company-wide systems and procedures function working with top management. Includes review of all internal and computer systems for work flow, efficiency, and controls throughout the company. Also have openings for qualified **METHODS ANALYST** and **PROCEDURE ANALYST** in this department.

COMPUTER SYSTEMS AND PROGRAMMING SUPERVISOR - Reports to Manager Systems and Programming. Supervises day to day computer system development efforts. Requires extensive IBM computer system development background in design, documentation and programming with CICS, DOS/VS and ANS COBOL experience. Requires 5 to 8 years senior level experience with a degree strongly preferred. Also have openings for **SYSTEMS PROGRAMMER** and **DOCUMENTATION SPECIALIST** in this department.

Please submit a detailed resume with salary history and requirements to:

P.O. Box 1546
797 Washington St.
Newton, Ma. 02160

Your response will be held in complete confidence.
AN EQUAL OPPORTUNITY EMPLOYER - M/F

Computer Engineer ASSOCIATE DEVELOPMENT ENGINEER U.C. IRVINE

(\$1724 to \$2080 per month)

Specify, design, and supervise the installation and operation of improvements to the computer facilities of the Medical Image Laboratory of the School of Engineering. Requires BA degree in Computer Engineering or Computer Science plus 3 years engineering experience including 1 year of responsible design work plus demonstrated experience in the design and documentation of computer hardware and/or software. Ability to design and construct and install improvements to computer facilities; ability to carry out research on computer architecture. Experience with computer image analysis and interactive graphics is desirable.

Apply for job CP 42 by May 19th, 1978.

UNIVERSITY OF
CALIFORNIA, IRVINE
Personnel Department
Room 152, Administration Bldg.
Irvine, CA 92717

Affirmative Action Employer
Minorities, Women,
Handicapped Persons and
Veterans Encouraged to Apply

COMPUTER SCIENCE FACULTY POSITION

A position may be filled at the Assistant Professor or Instructor level by a person qualified to teach programming courses (COBOL, FORTRAN, Assembly) and having expertise in business data processing, systems software, or hardware. The position level will depend on credentials. The minimum academic credential is an M.S. degree in computer science or related discipline. Ph.D. preferred. Appointment may be temporary or continuing. Salary is competitive and starting date is August 30, 1978. Send, by April 30, a resume with names and addresses of three references to Dr. Jarrell C. Grout, Chairman, Department of Computer Science, Stephen F. Austin State University, P.O. Box 6167, Nacogdoches, Texas 75962. Equal Opportunity Affirmative Action Employer.

SYSTEMS ENGINEER

Major computer mfr. seeks sharp systems programmer with exp. in VM or SVS. Must know internals & have diagnostic ability in MVS & JES-2. Heavy software debugging techniques required. BS preferred. Excellent oppty. Salary to \$28,000. (Fee Paid). Contact Gerry Battista,

**ROBERT HALF
PERSONNEL AGENCIES**
140 Federal St.
Boston, Mass. 02210
(617) 423-6440

MANAGEMENT CONSULTING

EDP Background

We can offer you new challenges for your EDP skills, growth outside EDP into other business areas, professional growth and development, and excellent compensation.

We are the Boston office of a highly-regarded international management consulting firm. We serve clients in industry and commerce in solving a wide variety of problems. This requires the ability to deal with Senior Management, developing solutions, and assisting in the implementation of recommendations. Our continued growth has created need for additional individuals who have:

- at least 2-6 years solid experience in EDP systems; analysis, design, programming, and implementation.
- College degree is required. An MBA is highly desirable but not required.
- Ability to communicate effectively with people.
- Desire for achievement and early responsibility.

Explore the possibilities of a career in general management consulting with a quality dynamic firm. In addition to Boston, we also have openings in other offices including: New York, Chicago, Denver and San Francisco. Please send resume in confidence to CW Box 1549, 797 Washington St., Newton, Mass. 02160.

An Equal Opportunity Employer M/F

Programmer Analyst

Let's talk systems.

We're Becton Dickinson Medical Systems, a leader in the field of medical electronics, with a newly developed opening on our EDP staff.

The Programmer Analyst we're seeking will report directly to the Manager of Data Processing, and should have at least 2 to 3 years experience. We require a solid background using IBM System 3, Model 15, in a COBOL or RPG II environment.

You assignments will focus on designing and developing programs for financial, manufacturing and marketing applications. Previous experience in one of these areas would be a plus, but is not required.

If your background matches our requirements, we'd like to hear from you. Call John McCain at (617) 828-9080, or write to him at Becton Dickinson Medical Systems, Rt. 1, Sharon, Mass. 02067.

**BECTON
DICKINSON**

Becton Dickinson
Medical Systems

An equal opportunity employer, m/f

E.D.P. PROFESSIONALS

If you are a programmer, programmer/analyst or systems analyst and would like the most individualized job search offered in the data processing field today, either on a local or national level, send your resume in confidence to:

**AFFIRMATIVE ACTION FOR
PROFESSIONAL WOMEN, INC.**
P.O. BOX 1301
SARASOTA, FLORIDA 33578

"WE AGGRESSIVELY SUPPORT
AFFIRMATIVE ACTION"

Opportunity Wanted

Your Man In The Northwest

NYC based successful manager/representative hardware peripherals seeks new challenging sales situation with growing stable profitable vendor or bank. Excellent bank penetration. EFTS a distinct possibility. Not an agency. CW Box 1548, 797 Washington St., Newton, Ma. 02160.

position announcements

position announcements

position announcements

position announcements

position announcements

Computer Professionals

For opportunities you will think are too good to be true, see our ad in the Miniworld Section of today's paper.

An Equal Opportunity Employer M/F

**THE
SEARCH
IS ON**

Honeywell

PROGRAMMERS AND ANALYSTS

**Free Employment Service
Northeast, Southeast & Midwest U.S.**

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

**Computer Professionals
TELL THE TRUTH
ARE YOU GROWING FAST ENOUGH?**

The Applied Technology Division of Computer Sciences Corporation can offer you the room you need to grow. As a major part of CSC, we provide information systems technology to many government agencies. Our opportunities match the requirements listed below, investigate immediately...

WALLOPS ISLAND, VA.

Real Time Programmers with Assembly Language experience with the PDP-11 or LSI 11 real-time operating systems.

KENNEDY SPACE CENTER, FLA.

Applications Programmers with degree preferred; Scientific & Real-Time Programmers with degree in related area desired; Systems Analysts & Programmers in support of Space Shuttle Launch Processor System with experience in real-time systems, minicomputer network or operating systems, degree helpful; Systems Programmers with experience on PDP-11, background in RSX-11D operating system and/or satellite image processing.

WASHINGTON, D.C.

Programmer/Analysts with COBOL or Fortran experience on the U-1100 or IBM 360/370 series, IMS helpful.

NORFOLK/HAMPTON, VA.

Scientific Applications Analysts with systems software on large scale computer, familiarity with CDC STAR desired; COBOL applications on 3rd generation systems, Univac 1100 series desirable.

GREENBELT, MD.

Programmer/Analysts with IBM 360/370 experience in COBOL, ALC, JCL, or PL/I on OS, MVS, MVT, VS-1 or VS-2.

MOUNTAIN VIEW, CALIF.

Scientific Programmer with Fortran experience on the CDC STAR 100 or Illiac IV desired.

RIDGECREST, CALIF.

Scientific & Systems Programmers with U-1100 Fortran, Assembly, or EXEC 8.

BAY ST. LOUIS, MISS.

Scientific Programmers with communications software, Fortran and Assembly language, numerical modeling, data base management, and graphics applications on microprocessors, minicomputers, and large scale computers.

These are just a few of our many openings. So if you're a Programmer/Analyst and CSC sounds like your kind of company, please send your resume to:

**Gus Siekierka
Director, Industrial Relations**

**COMPUTER
SCIENCES
CORPORATION**

Applied Technology Division
6565 Arlington Boulevard
Falls Church, Virginia 22046
Major Offices and Facilities throughout the World
Equal Opportunity Employer M/F

WORK ON WANG'S 32-BIT VIRTUAL MEMORY COMPUTER

WANT TO BECOME A COMPLIER DESIGNER IMPLEMENTOR?

WANG has several openings for junior to intermediate level systems programmers working on BASIC, COBOL, PL/I, RPG-11, and our data base query/report languages. You must be bright and enthusiastic, your work well organized, well documented, your solutions an example of creative implementations showing depth of understanding of the problem. The specific area of your previous programming experience is not important. If you believe that high quality work is its own reward and want to join a team of individuals who hold the same ideas, send in your resume.

DIAGNOSTIC PROGRAMMER ANALYST

As part of a team that has corporate responsibility for test software, you will be designing software and firmware test systems for microprocessor control computer systems and associated peripherals. Specific areas include telecommunications, I/O processing, on-line and off-line system testing and much more. In new product development you will be involved from the design stage through the manufacturing process to customer engineering user interface, solving problems and suggesting design changes where necessary. This is a high-visibility position, offering responsibility and exceptional growth potential. The ideal candidate will have a B.S. in Engineering and an understanding of computer architecture and logic design, and experience in assembly language programming, preferably 8080, and previous test software development experience a definite plus.

DATA BASE SYSTEMS DESIGNER/IMPLEMENTOR

When was the last time you had the chance to design and implement a major new data base product? Well here's the challenge: we seek expertise gained through experience or education in data base models, higher level query languages, data description and data dictionary support, lower level data sub-languages, storage structures and access methods. While specific experience is important, we feel that your desire to go beyond present DBMS state-of-the-art by providing creative solutions for future data base requirements is a plus. If you'd like to contribute in an environment which places a premium on your ideas, send your resume.

We offer salaries commensurate with experience and ability and comprehensive benefits. Please send resume to Stephen E. Pitt, Manager Professional Recruiting. Please include salary history. Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851. (617) 851-4111, or call our TOLL FREE number 1-800-225-0654. Please specify account number, 02179, when calling.

We are an affirmative action employer.

WANG

LABORATORIES, INC.

Systems Analysts

We are a major Midwest-based organization currently seeking applicants for the following:

Openings are in our Systems & Procedures Department for qualified Systems Analysts.

The applicants we select will possess a minimum of 5 years experience in programming (as a Sr. Programmer/Analyst) and a comprehensive knowledge of COBOL; OS-JCL, Utilities, Operating Systems, Sort-Merge and CICS. Command of a second language is a plus. Previous project responsibility is required, experience in design, programming and implementing on-line systems ideal, but not mandatory. Familiarity with concepts of packaged software (particularly MSA) is necessary.

Include installation of financial software packages, design, programming, installation and debugging of programs, the analysis of problems and the establishment of procedures. Will also supervise Programmer/Analysts and occasional special project assignments on a consultant basis.

We offer competitive salaries and comprehensive benefits that include paid relocation. Submit your resume, including salary history and requirements, in complete confidence to:

**CW Box 1536
797 Washington St.
Newton, MA 02160**

An Equal Opportunity Employer M/F

**FLORIDA
BANKING**

Prog/Anal	18K
Inst Loan	14K
Prog-Mort Loan	14K
Prog NCR CIF	18K
Sr P/A S&L	
on line	17K
Prog/Anal CPCS	20K
Prog/Anal DDA	16K
Prog/Anal	
Tr Accts	15K
Prog EFTS BAL	16K
Prog/anal S&L exp	15K
Cust Service 2yrs	14K
Prog Burr 2700	15K

**ROBERT HALF
PERSONNEL AGENCIES**
1311 North Westshore Blvd.
Suite 309
P.O. Box 22651
Tampa, Florida 33622

SUNBELT PROGRAMMERS

We have many clients in the sunny recreational sunbelt area looking for programmers, programmer analysts, system analysts, and systems programmers with IBM (OS or DOS) cobol, burroughs, assembler, BAL or CICS experience. Salaries \$14,000 to \$25,000. Submit resume with current and required salary, relocation preference to:

**Executive Recruiters
Personnel Agcy., Inc.
3700 Cantrell Suite 104
Little Rock, AR 72202
(501) 664-3313**

position announcements

position announcements

position announcements

position announcements

position announcements

Hell (Mich.) might be just the place for you*

Or Seattle, Phoenix, San Francisco, New Orleans, Denver, Miami, Richmond, Boston, Philadelphia . . .

Location and life style are important considerations in picking your next job. So are improvement in salary and promotional opportunity. We can help you on all counts — since we represent over 1000 EDP openings directly or through affiliates in all parts of the country.

Programmer Analysts, Project Leaders and Software Specialists in the \$15 to \$30 K range: Let us put our knowledge of the EDP job market to work for you. Call us.

*Sorry, there is no Heaven anywhere in the U. S. You're probably not surprised.

No fees or contracts. Our client companies pay all expenses. Career consultation prior to any action.

Send your current resume (or an old one with pencil update) together with salary history in complete confidence to our suburban Philadelphia headquarters.

Systems Personnel, Inc.
Suite B-16
207 Fox Lane
Wallingford, PA 19086

Systems Personnel Inc.

A NATIONWIDE CAREER SERVICE

CSC

OUR CHALLENGE IS YOUR NEW OPPORTUNITY.

As the world's leading independent computer software firm, Computer Sciences Corporation provides optimum career opportunities to high-caliber individuals. Our Commercial Division develops systems for manufacturing, banking, insurance and other industries, and seeks to increase our staff of professionals in San Francisco, Los Angeles and New Jersey. Immediate openings exist in the following areas:

Sr. Programmer Analyst

Candidates must have experience in the design and development of large scale commercial systems utilizing COBOL and data base management systems.

Systems Programmer

Your responsibilities will include support of UNIVAC 1100 EXEC, CMS, DMS-1100, TIP, COBOL, and Compiler and System Utilities. This position requires programming experience with UNIVAC software, preferably in an on-line TIP/CMS environment.

All of the above positions require at least 4 years' current experience, as well as the motivation to excel. CSC offers you long-term advancement potential within a professional environment, in addition to competitive salaries and excellent fringe benefits. To apply, please call or submit your resume, in confidence, to:

Cathy D'Amico
(213) 678-0311 Ext. 1193

Commercial Division
220 Continental Blvd.
El Segundo, CA 90245
Major Offices and Facilities
throughout the World
Equal Opportunity Employer M/F

COMPUTER
SCIENCES
CORPORATION



SOFTWARE ENGINEERS

At E-Systems, you can build a career with one of the fastest growing internationally known corporations. If you would like to change your job to a career, our Garland Division in Dallas, Texas is looking for Software Engineers with the following qualifications:

- Experience in systems architecture and design, software development, and systems integration, test, and implementation of computer based systems using DEC PDP-11 series computers utilizing the RSX-11 D/M or IAS operating systems.
- Experience in data base management architecture and design, utilizing Fortran or assembly language to interface with Total, IDMS, or similar DBM systems.



E-SYSTEMS
Garland Division
An equal opportunity M/F employer

If you qualify, send your resume to:
**Employment Manager
E-Systems
P.O. Box 226118
Dallas, Texas 75266**

Data Processing

PROGRAMMER ANALYST (MINICOMPUTERS)

WE'RE IN THE MARKET FOR GREAT IDEAS! TAKE A GIANT STEP INTO THE MOTOROLA FUTURE.

We've come a half century of age because we have been responsive to the innovative ideas of enterprising professionals.

The expansion into our NEW MAJOR MOBILE COMMUNICATIONS FACILITY in Ft. Worth has created an environment tailor made for a talented programmer analyst.

REQUIREMENTS:

- *BSEE preferred, FM radio or RF circuit knowledge helpful.
- *Must have Fortran and assembler program experience.

RESPONSIBILITIES:

- *To automate material-handling systems
- *To automate RF test procedures
- *To implement test-computer network

Our salary schedule will compliment your experience; our benefits program rounds out a favorable compensation package. Forward resume or call (COLLECT) to:

(817) 232-1980

Professional Recruiting Dept. 130



MOTOROLA INC.

COMMUNICATIONS GROUP

5555 North Beach Avenue
Ft. Worth, Texas 76118

equal employment opportunity/
affirmative action employer

Programmer/Analyst

Scientific Application

Our R&D facility, located in upstate New York, is expanding its Scientific Systems Dept. We are seeking an innovative and versatile Programmer/Analyst who possesses a background in computer programming in the life sciences and preferably 1-3 years experience in scientific applications design and programming.

Responsibilities will entail the recommendation and development of new computer based applications in our Research Division and will include performing all levels of systems development work from conception through coding and documentation.

Programming languages used include FORTRAN, BASIC and PL/1; packages include Inquiry, SAS and BMDP. We utilize the HP 3000 minicomputer with Timesharing System, RJE to IBM 370/158VM. Interested candidates should submit a resume and salary requirements to:

Jane Belansky, Personnel Representative
Norwich-Eaton Pharmaceuticals
Division of Morton-Norwich
P.O. Box 191 Norwich, New York 13815
An equal opportunity employer, M/F



position announcements

position announcements

position announcements

position announcements

position announcements

computer hardware and software candidates RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies, anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the foot-work.

SUPERIOR RESOURCES
16400 Ventura Blvd.
Encino (L.A.), CA. 91436
(213) 966-4400

COMPUTER CAREERS INC.
Specialists
Data Processing
4720 Montgomery Ln., #503
Bethesda, Md. 20814
(301) 654-9225

ANDERSON-TAYLOR
P.O. Box 21
Exton, PA. 19341
Philadelphia area
(215) 363-1600

members of
National Personnel Associates
Specializing in DP

PROGRAMMER/ ANALYSTS

Our Vermont operations are expanding, and we are increasing our data processing capabilities to take on additional load requirements.

We have immediate openings for experienced programmer/analysts to work with operations management to develop and service programs for various applications in their respective areas. Candidates should have at least 2 years industrial experience in an off-line data based environment, preferably with IBM System 3 hardware and RPG 2 language. We are a century-old company, situated in a superior skiing, fishing and outdoor area with international sales and affiliations. If qualified, send your resume in confidence to: Director of Personnel.

**VERMONT
MARBLE COMPANY**

61 Main St.
Proctor, VT 05765
An equal oppty. employer M/F

CAPEX POSITIONS IN PHOENIX, LOS ANGELES

Here's your chance to join a rapidly growing proprietary software business. Continued growth has created a variety of positions open to individuals anxious to accept the challenges and opportunities available.

We seek exceptional individuals who have acquired a solid, fundamental background and are looking for a change. Openings include the following:

Technical Representatives (Los Angeles, Phoenix)

Work with some of the most sophisticated installations in the world supporting our line of IBM OS and OS/VS system performance products. Requires a minimum of 2 years experience with IBM OS-level systems, a solid understanding of system concepts, and a demonstrated ability to work with people. Exposure to MVS system tuning, IMS, or COBOL programming desirable.

Technical Writers (Phoenix)

Translate comprehensive product specifications into user-oriented promotional or reference publications for program products ranging from financial modeling to detailed system tuning. Must have proven writing skills and a working knowledge of IBM OS programming and systems.



Qualified candidates should call or write: Marketing Recruiting, Capex Corporation, 2613 N. 3rd Street, Phoenix, AZ 85004. Phone: (602) 264-7241.

An Equal Opportunity Employer M/F

ENGINEERS AND PROGRAMMERS

Lockheed Electronics Company is seeking qualified applicants for immediate positions at NASA's Johnson Space Center in Houston, Texas. These positions are in support of the Space Shuttle and Earth Resource Programs and require applicants experienced in the following areas:

• PUBLICATIONS SPECIALIST:

To originate scientific/engineering publications and coordinate efforts of editors and proofreaders. Prefer applicants with a minimum of eight years experience.

• DIGITAL DESIGN ENGINEERS:

With experience in design and development of digital/analog equipment including computer interface, display, control and signal conditioning hardware.

• MECHANICAL/AEROSPACE ENGINEERS:

Responsible for structural, thermal or environmental control systems analysis. Applicants should have knowledge of FORTRAN computer programming, math modeling, and be capable of using large scale digital computers in the analysis of engineering problems.

• SIMULATION APPLICATIONS:

Required to support dynamics simulation development and operations. Experience required in realtime, digital, analog and hybrid computer program development and operation of large man-in-the-loop simulations. Prefer applicants who have worked with spacecraft/aircraft GUIDANCE and CONTROL systems.

• COMPUTER MAINTENANCE ENGINEERS:

To be cross-trained to support a large, diverse simulation laboratory. Facility includes analog computers, mini-computers and second and third generation medium-to-large scale systems manufactured by several companies.

• CONTROL SYSTEMS ENGINEERS

With experience in flight controls; guidance, navigation and controls; digital design; computer interface, and data systems programming experience on HP 2100 computers.

• PROGRAMMING ANALYSTS:

Responsible for performing analysis and developing appropriate computer models. Experience in FORTRAN IV and ASSEMBLY language required. Some positions require UNIVAC1108 programming experience.

• COMMERCIAL/BUSINESS APPLICATIONS PROGRAMMERS:

With experience in design, development of financial, accounting and control systems using COBOL, FORTRAN, or ASSEMBLY languages.

• STATISTICIANS:

With advanced degree and experience in pattern recognition, clustering, feature selection, discriminant or multivariate analysis.

Send resume in confidence to Bill Jancha at Lockheed Electronics Company, Dept. C-20-28, 1830 NASA Road #1, Houston, Texas 77058.

**LOCKHEED
ELECTRONICS COMPANY, INC.**

An Equal Opportunity Employer Male/Female

EXPANDING EDP SERVICES ORGANIZATION HAS EXCEPTIONAL OPPORTUNITIES IN THE FOLLOWING AREAS:

ATLANTA
BOSTON
CHICAGO
CLEVELAND
DALLAS
DENVER
DETROIT
FLORIDA

HARTFORD
HOUSTON
KANSAS CITY
LOS ANGELES
MINNEAPOLIS
NEW ORLEANS
NEW YORK

NO. CAROLINA
PHILADELPHIA
PHOENIX
SAN DIEGO
SAN FRANCISCO
ST. LOUIS
WASHINGTON, D.C.

These are ground floor opportunities for fast-track, but ethical, individuals with knowledge of software markets. Desirable characteristics are: outstanding managerial, interpersonal, planning, recruiting, organizational, technical and sales skills as well as a professional image.

CONTACT YOUR NEAREST "COMPUTER TALENT SOURCE"

MCCORMICK & ASSOCIATES

386 N. York, Elmhurst, ILL 60126, (312) 530-1200

XAVIER ASSOCIATES

P.O. Box 390, 850 Rear Providence Hwy.
Dedham, Mass. 02026 (617) 329-6280

DATA PROCESSING CAREERS

Executive Plaza Bldg, 4615 S.W. Freeway
Suite 960E, Houston, Texas 77027 (713) 960-9102
Agency Inquiries Invited

DIRECTOR SYSTEMS MANAGEMENT

We have an immediate opening for exceptional individual to assume responsibility for the Systems Management Department in a 620-bed, acute care hospital. Involves planning, designing and updating of existing business and clinical computer systems. The successful candidate must have management experience in a data processing environment, proven technical competence and the ability to communicate effectively with administrative and medical personnel. Hospital experience and a college degree are desirable but not required. Starting salary in mid 20's. Please send resume including salary history in confidence to:

Darrell M. Walters
Employment Mgr

St. Luke's
Methodist Hospital
1026 A Ave. NE.
Cedar Rapids, Iowa 52402

System Design & Software Development Manager

Clemson University is seeking a System Design and Software Development Manager to design and implement new system software for a statewide network, provide technical support for hardware installation, maintenance, and enhancements, maintain and modify IBM system software, and assist computer users in solving complex software problems. Experience with HASP, JES2 and telecommunications required; BS in electrical engineering or computer science desirable. Salary range \$18,012 - \$25,599. Send resume to:

Dr. C.J. Duckenfield
Director
Clemson University
Computer Center
Clemson, S.C. 29631

An Equal Opportunity Employer

Allen Services

THE ROAD TO SUCCESS

ALLEN SERVICES CORPORATION can pave the way to a more satisfying career for Programmers and Analysts. As a leading contract programming firm, we provide diversified challenge and career growth without professional stagnation. Our excellent salaries and the benefits listed below prove that our compensation plan is superior.

- Per diem allowance (for relocation & misc. expenses)
- Paid Vacations and Holidays
- Company paid Major Medical Insurance
- Life Insurance for you and your family
- Special welcome back financial consideration for previous employees

Call our toll free number Monday thru Saturday and ask about our numerous Programmer/Analyst openings in 5 national offices.

(800) 543-7583

ALLEN SERVICES CORP.

DAYTON AIRPORT OFFICE

212 West National Road
Vandalia, Ohio 45377

In Ohio Call collect
(513) 890-1200

EOE

position announcements

position announcements

position announcements

position announcements

position announcements

COMPUTER SCIENCE ANALYSTS

Excellent career opportunities with Brookhaven's Central Scientific Computing Facility of Control Data Cyber 76 and front-end 6600's used by scientists at the Laboratory as well as at many other research organizations.

- **Operating Systems Group** - Programmer with experience in maintenance or development on CDC Scope 2.1 (Cyber 76) or Scope 3.4 (CDC 6600)
- **User Services Group** - Experienced Programmer with background in scientific applications, systems, documentation and user training.

We are a leading scientific research establishment with 3500 employees located in mid-Suffolk County, Long Island, on a pleasant campus-like site of 5000 acres. Working conditions and fringe benefits are excellent.

Please send two copies of resume and salary history to Building 185, referring to Position 12546K:

**BROOKHAVEN
NATIONAL
LABORATORY**

Associated Universities, Inc.
Upton, L.I., New York 11973
An Equal Opportunity Employer M/F

WORLD VACATION

If you have skills with IBM IMS-Teleprocessing, IMS DB-DC, COBOL, IDMS, COBOL, CICS, COBOL/BAL or have an interest in these, please call. We have two options:

- Long term consulting
- Immediate Hire

We encourage you to go work for our client if the chemistry is right. Our client, located in Dallas, has 4000 terminals to twin 370/168's IMS, Financial and Manufacturing Systems, MVS, JES 3, TSO, Lbrarian. Sophistication, best development opportunity available. If you work for us we will pay for one week paid vacation in any city in the world, plus Life, Health, Overtime, Top Dollar plus two weeks second year. Consulting position in Dallas, with other numerous permanent positions available Dallas, Houston, and the Southwest.

**Professional Programming
Services, Inc.**

2829 West Northwest Highway
Suite 207
Dallas, Texas 75220
(214) 350-7706

P.S. We have a Personnel Consulting Group to serve your permanent career change if so desired. Unique approach no one else has thought of giving you the best of both worlds. Do not miss this opportunity.

SYSTEMS PROFESSIONALS NATIONWIDE SERVICE

Tech Consult To \$45K
Northeast major comm'l corp.
Heavy P.O.S.
Supv Mfg Sys To \$27K
Southwest \$bill corp 158/OS
mfg state-of-art
Bus Sys Mgr To \$39K
Midwest corp hdqtrs mfg, fincl,
mix
Relocation & Fees Paid by Client
Co.

FORTUNE
DIV FORTUNE
PERSONNEL AGENCY
505 5th Av. NYC 10017
(212) 682-8600
Company Inquiries Invited

Connecticut & New England EDP CAREERS

SOFTWARE MANAGER - to 30K
Fortune 200 mfg. firm seeks IMS-OS
internals plus management expertise.

SYSTEMS SPECIALIST - to 29K
IBM-OS insurance. Analyzes software & hardware
needs. solve performance problems.

SOFTWARE PROGRAMMER - to 24K
Strong OS internals, sys. gen. &
debugging skills. Mfg b/g preferred.

PROJECT LEADERS - to 24K
Top Ct firm, solid OS mfg. sys.
b/g. BOM, PC, DB, CICS all pluses.

SYSTEMS PROGRAMMERS - to 24K
Min 2 yrs exp with MVS, to
develop new exciting projects.

PROGRAMMER ANALYSTS - to 24K
2 yrs. OS-COBOL exp. high career growth
potential. DB, IMS, TSO all assets.

OPERATIONS MANAGERS - to 20K
5 yrs exp in lg frame IBM
installation. mfg b/g preferred.

Call (203) 521-7400 or Write

Richard P. Rita
Executive Recruiters

29 No. Main St. W. Htfd., CT 06107
All fees are assumed by our client companies

POSITIONS NATIONWIDE CALL TOLL FREE 800-426-0342

Florida Client needs
the following:

Soft. Eng. with exp. in PDP 11
syst. Applied to PC and DC in a
real time environment.

Logic Design Engineers with
State-of-the-art MSI/LSI

Design exp. TC exper. a plus.
Technology Engineers with exp.
in circuit and subsystems design
for computer and communica-
tions systems.

Salaries are excellent (to 30K)
along with comprehensive bene-
fits and a modern engineering cen-
ter.

BILL ISGRIG

PARKER PAGE ASSOC.

P.O. Box 12308
Seattle, WA 98111
Offices in Wash., D.C.,
Chicago, Atlanta, Portland, Or.

Tektronix Sales Support Analyst

District Technical Support Manager

Tektronix is the leader in interactive computer graphics, one of the fastest growing segments of the computer industry. In just the last year, we grew 50%. We're seeking three professionals to form the nucleus of our Boston Sales Support Team and provide technical support to a dynamic sales team that is setting growth records again this year. Positions now available are:

District Technical Support Manager

with 2-4 years' management experience in the technical support area.

Sales Support Analyst

- Computer Science degree or equivalent
- Programming and systems analysis experience
- The ability to work with sales personnel and customers

We Can Offer You

- Challenge, responsibility and diversity
- A very competitive salary and benefit package
- The full support of an organization committed to excellence

We offer tremendous potential to success-oriented individuals who join our team now. For more information call collect or write:

Mr. George Evans, TEKTRONIX, INC., 2 Research Court, Rockville, Maryland 20850. Phone (301) 948-7151. An Equal Opportunity Employer M/F/H.

Tektronix
COMMITTED TO EXCELLENCE

The Best Hires Only the Best.

We're Applied Digital Data Systems, the leading independent supplier of teletype-writer compatible CRT terminals. We build the highly successful REGENT Series smart terminals and SYSTEM 70 intelligent terminals. And we're growing very fast. So we have several key openings for management and technical personnel.

If you're the best

- Director of Quality Assurance
- Test Engineering Manager
- Industrial Engineering Manager
- Test Engineer
- Industrial Engineer
- Digital Design Engineer
- Mini/Micro Programmer
- Configuration Control Supervisor

...send your resume to our personnel department.

We think we're the best. You think you're the best. Let's make the best even better.

ADDS

Applied Digital Data Systems Inc.
100 Marcus Blvd., Hauppauge, New York 11787
An Equal Opportunity Employer



The MIS Department of the National Broadcasting Company is undergoing expansion in its New York City corporate headquarters. Challenging and rewarding positions are available at all levels in the applications and systems programming areas, supporting the TV Networks, TV Stations, and News Divisions. The environment includes a UNIVAC 1100-44 installation with front-end processors and minicomputers.

APPLICATIONS PROGRAMMER/ANALYSTS

Candidates should have 2 or more years experience in COBOL programming, preferably in an on-line development environment. 1,100-EXEC, DMS, and FORTRAN area also desirable.

SYSTEM PROGRAMMER ANALYSTS

Preferred background includes intermediate to senior level software programming experience on a large real-time system, or senior level telecommunications experience, preferably with UNIVAC 1100 Series equipment.

Send your resumes, in complete confidence to: Mr. Clyde Hamilton, NBC, 30 Rockefeller Plaza, New York, N.Y. 10020.

an affirmative action employer m/f

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

BUY SELL SWAP

FOR SALE

OLIVETTI TE300

KSR Terminal
With
Paper Tape Rdr/Punch
Acoustic Coupler & Stand

\$800

Excellent Condition
TRANSNET CORP.
2005 Rt. 22
Union, N.J. 07083
(201) 688-7800

New DEC Surplus

DEC PDP11/34A-LE
64KB MOS Memory
10-1/2" Cabinet
DL11W & KY11-B
Console

DEC List \$13,460

Your Price \$9,895

**Computer
&
Peripheral Exchange**

WC Yost
P.O. Box 575
Gulf Breeze, FL 32561

904-434-2688

Check With Us For
Other DEC Savings
Buy - Sell - Trade

Why Comdisco is First in the Second Market:

IBM Processors available

145/148

Sale or lease
Immediately
avail.

155/158

Machines
available
now.
Sale • Lease
• Trade

165/168

Lease machines
interim to
your 3033.

3032/3033

Avail. 4th Qtr.
Lease only.

IBM Peripherals available

3420

We will purchase
your 1600 BPI
drives and replace
with Models 4 or 6
immediately.

3830-2

3330-33
3340-A2,B2
Sale or
Lease

3420-5

With #6631
available now
Sale — Lease

3350

Want to buy
P.O. credit
machines

IBM 3031, 3032, 3033 operating leases available.

Atlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107

COMDISCO

New York 201/568-9666
San Francisco 415/944-1111
Paris, France 374-1130

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

Your First Choice in the Second Market

WANT TO BUY

- IBM 3420/8 Tape Drives
- IBM 3211/3811 Printer
- IBM 3333/3330 DASD
- IBM 3277 CRT's and Controllers
- IBM 370/135 Model I - 512K

FOR SALE OR LEASE

- IBM 3420/3 Tape Drives
- IBM 370/138 J (1 year lease)
- IBM 3240/5 Tape Drives
- IBM 2501 Card Reader
- IBM 3330 DASD
- IBM 3277 CRT's and Controllers
- IPC 6780 Block MPX Channel

Call

**FORSYTHE
McARTHUR**

(312) 943-3770

Forsythe McArthur
Associates, Inc.
919 North Michigan Ave.
Chicago, IL 60611

Dealer &
Lessor In IBM
Computers.

Member Computer Dealers Assoc.

ACR

EDP departments save money
working with brokers and
dealers linked by the ACR
network:

- ☐ national markets,
- ☐ on-line access,
- ☐ better matches of
equipment to need.

For your nearest ACR broker/
dealer contact:

American Computer Referral
423 South Brookhurst St.
Anaheim, CA 92804
(714) 776-2411

The only on-line computerized
data base for computer equipment

★ NEW DG NOVA 3/12's

WITH BATTERY BACKUP AND
AUTO PROGRAM LOAD
AND RESTART
NEW DG MEMORY
32 OR 16 KB

IMMEDIATE DELIVERY WITH
22% DISCOUNT

CALL CLARK & ASSOC.
(816) 741-3183

LINE PRINTER FOR SALE

Dataproducts Model 2230 pur-
chased new June 76 used until
June 77. Printer was used to print
Administrative reports on a
PDP-8. Asking \$8,500 complete
with cables and technical man-
uals. Contact Director Computer
Services, Vermont State Colleges,
Haskell Hall CSC, Castleton, VT
05735.

FOR SALE OR LEASE

370/168

AVAILABLE JUNE '78

(MODEL 1, 3 or A)

Bob VanHellemont

CMi CORPORATION — (313) 642-8000

LEASE ONLY - LARGE SCALE IBM SYSTEMS

DATES AVAILABLE

3031's

11/78, 5/79, 6/79

11/79, 5/80

3033's

6/79, 9/79, 12/79

SHORT TERM LEASES

3168 LK**6/78****3168 M****11/78**

For details, call R. Weissblatt-216/351-7444

ATTENTION HONEYWELL USERS!

66/20 For Lease—Complete System
196K Word Central Processor, including
Front-end Communication Processor

HIS RENTAL \$23,000/month

TCP RENTAL\$ 7,000/month

64/20, 64K, Full I/O, Comm., Avail. Immed.

For details, call Larry Donat-216/351-7444

The Computer Place

4650 Spring Road
Brooklyn Heights, Ohio 44131
(216) 351-7444

A Division of D&D Financial Enterprises, Inc.



dearborn taketh your surplus IBM
equipment and make it disappear
or leaseth it back to you

Call Tom Millunchick
(312) 827-9200

or any dearborn office



dearborn
computer company

dealer-IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788 • dallas (214) 748-5899

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

CMI BUY LINES

BUY-SELL-LEASE-TRADE

Call (313) 642-8000

3031/3032/3033

3031 Delivery 12/78
Marilyn Burchi

3420	3803	1403	2821
3333	3830	2501	1442
3330	3340	1443	

Darryl Hastings

Joe Romeo

360
30/40/50/65
Best of Values3270 CRT's
Printers/Controllers1130
Jim Carleton

System/3

Model 15
Jerry Roberts

3742

3741

5496

Patti Lamia

360/20

085-083-029-059-026-129

Marie Bednarz

370/165 370/168

168 Available June '78
(2) Available July '78

370/158

Ron Baker

370/155

(1) Available Now!

370

148/145/138/135

(4) Available now to June

370/115/125

Call for Details

BUY OF THE WEEK

370/168

SN 60306

June availability. Will
configure to your requirements.

370/155J

DAT • 3 Channels
1 Meg IBM • 3215 Console
Available Now! \$575,000
Gary Smith

135 1

S/N 61027

All IBM Memory
IFA, IPA, ICA
Available April.

360/20

All Models
Immediate Delivery
Purchase/Lease Plans
Available
Call
Marie Bednarz

IBM 158

Memory I to KJ

Available April.

Call (313) 642-8000

WANTED

BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299Boynton Business Systems
87 Route 208
Wallkill, N.Y. 12584
914-895-2007

DEC HARDWARE

PDP 11 PDP 8

Processors Peripherals
MemoriesVT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

2314-B1

- Up to 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

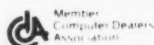


FOR SALE

IBM Model
158 MemoryK to KJ or U34 to U35
Available May
Call Anne Rhame
CommonwealthComputer Advisers, Inc.
707 East Main Street
Richmond, Virginia 23219
(804) 643-4200

The IBM Specialists

1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000



IN CANADA CALL:

Don DuPuis
Windsor, Ont.
(519) 258-8910Ron Ridding
Toronto, Ont.
(416) 683-3704Jacques Dagenais
Montreal, Que.
(514) 374-5920

370/165-II

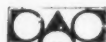
- FOR SALE OR LEASE
- AVAILABLE JUNE 1978
- AS SHORT AS 24 MONTH LEASE AVAIL.

CALL TED MOLINARI AT:

(201) 947-4200


IPS COMPUTER MARKETING CORP.
2460 LeMoine Avenue
Fort Lee, N.J. 07024

IBM UNIT RECORD EQUIPMENT

024 077 085 402 514 552 026
082 087 403 519 557 029 083
088 407 523 602 056 084 089
408 548 604 029 129We Buy Sell or Lease
360s 1400s 1440s

Data
Automation
CompanyPioneers in the Computer Industry
National Disk Pack Center
(214) 637-6570
4858 Cash Road
Dallas, Texas 75247

BUY SELL LEASE

SYSTEM/3

Models 15, 10, 8, 6
Systems 32 & 34

All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298

Memphis, Tn. 38128

Phone 901/372 2622

Member CDA

BUY - SELL - LEASE -BROKERAGE-

Let the
"Nation's Largest Wholesale Dealer"
Buy, sell, lease sub-lease, or be
your agent in placement of your
pre-owned IBM 360/370/System
3, or other unitsCOMPUTER INTERNAT'L LTD
BEACH COMPUTER CORP.
CWC's Leasing Division
COMPUTER WHOLESALE CORP.
(504) 581-7741Suite 507/508 First National
Bank of Commerce Bldg.
New Orleans, LA 70112
Member Computer Dealers Assoc.

FOR SALE

DEC K110 SYSTEM

256K Core, DC76, (6) RP03, (2) 9 Track Mag Tape, (4) RS04
Swapping drums, (2) TU 56 DEC Tapes. Excellent Condition - DEC
Maintained - July Delivery - Exceptional Buy.

SMALL DEC K110 SYSTEM

Excellent Condition - DEC Maintained - August Delivery

Contact:

J.W. SPENCER ASSOCIATES
(404) 296-7600

SYSTEM/3

FOR SALE OR LEASE

- 3271-2 Control Units, 7 Available Immediately
- 3277-2 Display Stations. Many available for immediate delivery.
- System/32 Many configurations available for immediate delivery including A-32, B-33, B-34, C-44. Other configurations available.
- 1403-2 or N-1 Printer and 5421-1 printer control unit.
- System/3 Model 10. Any configuration

WE WANT TO BUY

SYSTEM/3 Model 15.

Any configuration. Rental credit machines OK. Highest prices and commissions paid.

We also need:

• Several System/3 Model 10's

• System/32's.

• 3340, 3411, 3410, 3741, 3742, 3277, 3271, 3272, 5421, 1403, 5496, 9610.

Call Collect or Write



computer corporation 114 central avenue, box 266, buffalo, minn. 55313 (612) 682-4884

PURCHASE

SELL

LEASE

370/168's, 370/158's
360/65's, 360/50's

ALL IBM PERIPHERALS

PLEASE CONTACT

Purchase Sell: Norm Usher

370 Leasing: Mike Swords

360 Leasing: Jack Dugan

DPF Incorporated
141 Central Park Ave. So.
Hartsdale, NY 10530
(914) 428-5000

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

WANTED

RANDOLPH NEEDS:
135s, 145s
Any Model
Sub-lease or Purchase

CALL MIKE SEEKINGS
TOLL FREE
800-243-5308

RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
537 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200

GENERAL LEDGER SYSTEM?

What was the only one on the 1977 Datapro Honor Roll?

The answer is: The UCC General Ledger/Financial Control System. It can solve the Accounting Department's financial information problems... without creating new ones for EDP. Call 1(800) 527-3250 toll-free (in Texas, call 214/688-7313) for more information.

UCC
UNIVERSITY COMPUTING COMPANY
P. O. Box 47911 • Dallas, Texas 75247



NATIONAL COMPUTER RENTAL
415 MADISON AVENUE
NEW YORK, NEW YORK 10017
(212) 532-1500

MEMBER OF TIGER LEASING GROUP

**SHORT AND LONG TERM
STRAIGHT WALK-AWAY LEASES
THAT'S RIGHT!**

National does not require our customers to guarantee any residual value or find qualified sub leases at the end of the initial term on the equipment.

**370/138, 148, 135, 145, 125
370/158's 168's
IBM Series-3031-3032-3033**

MEMBER OF COMPUTER LESSOR ASSOC.

DEC SYSTEM-10
Performance Improvers
Disk System DF10, RP10, RP03
Memory 2MG10's (128Wea)
IMMEDIATE AVAILABILITY
Contact John Vonk (602) 273-4330
micor
3838 E. Van Buren
Phoenix, AZ 85008

DATRONIC RENTAL

135 FEATURES

FOR SALE - 6/15/78

4655 - IFA
4670 - IPA
4672 - IPA
4640 - ICA
4722 - 1st Line
4723 - 2nd Line
7862 - Ctl. Stor.
96K - 192 Memory Increment

FOR SALE OR LEASE

135 SYSTEM
512K with Disk, Tape,
I/O Set. Available
Immediately

WANT TO BUY

3274 - Direct Control
6982 - 2nd Channel

Call Will Foss
Datronic-312/992-0760

URGENTLY NEEDED! ANY QUANTITY!

DEC and DATA GENERAL
computer equipment

CASH AVAILABLE

CALL TODAY!



(313) 994-3200

NEWMAN COMPUTER EXCHANGE

1250 North Main Street Department CW14
P.O. Box 8610 Ann Arbor, Michigan 48107

DIRECT FROM FACTORY • TESTED • WARRANTED

MODEMS

Used ICC Modems at Significant Savings

Now you can buy or lease dependable ICC modems at a special low cost. We have a stock of modems, largely from customers who upgraded their data communications networks with our latest modems. These modems have been factory tested, are under warranty, and are backed by Racal-Milgo's nationwide service/support organization. Quantities are limited. Prompt action can assure you of these substantial savings.

May Special
Order now and
Save 68%



4800 bps

over original price on this 4800 bps modem.

Modem 4500/48 is an adaptively equalized 4800 bps data set. The modem, when new, sold for \$4,980; the normal Special Offer Division price is \$1,795. During the month of May, you can purchase the 4500/48 for \$1,595. A typical 30 month lease rate is \$72/month.

The 4500/48 operates over 3002 type unconditioned lines and, for backup purposes, will operate over most dial lines in a 4-wire mode using two (2) RCD's. Multipoint operation (2x2400 bps) is optional on the 4500/48.

Offer expires May 31, 1978.

Conditions of Sale

- 1) Orders must be postmarked prior to May 31, 1978 with delivery scheduled no later than August 1, 1978.
- 2) Offer subject to availability of products.
- 3) All prices are F.O.B., Miami, Florida and do not include installation.
- 4) Based on ICC Terms and Conditions.

40+ TK1 Data Station



The 40+ TK1, a high speed direct dial data station, is now available through our Special Offer Division.

The 40+ TK1 stores messages in an MOS solid-state buffer and is designed to replace low-speed, leased-line and tape oriented terminals. (Note: The 40+ TK1 can be used as a Wiltek replacement.) Data transmission speeds range from 1200 to 2400 bps over dial up lines. The data station includes an ICC 40+ display station, keyboard, control module, printer and desk—all for the introductory price of \$7,950 (original price was \$14,000).

Typical Savings

2000 bps



MODEM 2200/20

Economical 2000 bps on dial up or dedicated telephone lines. WE201A compatible.

Original Price

\$1780
\$60/mo.*

Special Price

\$600
\$24/mo.*

2400 bps



MODEM 2200/24

Half or full duplex operation over dial or dedicated facilities.

\$1780
\$60/mo.*

\$725
\$29/mo.*

3600 bps



MODEM 3300/36

Dial or dedicated operation with reverse channel. Optional auto-answer on dial-up.

\$3620
\$85/mo.*

\$950
\$38/mo.*

7200 bps



MODEM 4800/72

Dedicated line with optional multipoint operation for up to three 2400 bps channels.

\$6900
\$165/mo.*

\$1995
\$80/mo.*

9600 bps



MODEM 5500/96

Dedicated line with optional multipoint operation for up to four 2400 bps channels.

\$7990
\$185/mo.*

\$2995
\$120/mo.*

Prices apply to sale or lease in U.S. only. * Based on 30 month lease.

Racal-Milgo Special Offer Division, 8600 N.W. 41st St., Miami, FL 33166

Reserve now. Phone collect (305) 591-5535 or send this form.

Racal-Milgo

— the new name for ICC

I want more information about your Special Offer Division products.

- ☐ Yes, I am interested in the May special. Please send order form and data sheet.
- ☐ Purchase ☐ Lease Quantity _____
- ☐ I'm interested in the following:

Product	Quantity

☐ Purchase ☐ Lease

Name and Title _____

Company _____

Street _____

City _____

State _____

Zip _____

Phone No. _____

☐ Please place me on your mailing list for future specials. CW4/24

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

DEC PROCESSORS PERIPHERALS & MODULES

BUY - SELL - LEASE - RENT

\$2,000,000

NEW & USED DEC INVENTORY

PROCESSORS:

11/04	11/40
11/05	11/45
11/34	11/60
11/35	PDP-8E

DISKS:

RK05F	RP03
RK05J	RP04
RK11D	RX11BA
RP02	S.I. 3010

TAPE DRIVES:

TJU16	WANGCO 1037
TMB11	W/PDP-8 interface

MEMORY:

MJ11BE	MM11UP
MM11DP	MM11WP
MM11L	MS11FP
MM11LP	MS11JP
MM11U	

MISCELLANEOUS:

DH11AD	KE11E
DL11A, B, C, D, E	KE11F
DL11W	KT11C
DR11B	KT11D
DR11C	M7259
DR11K	M7260
DU11DA	M873-YB
DZ11A	M920
DZ11E	M930
FP11C	M9301-YA

OTHER:

BEEHIVE SUPERBEE

HP-2114

LEAR SIEGLER ADM-1

PENRIL 1800 BPS

For fast delivery and substantial Savings\$
CALL the DATALEASE Digital HOTLINE

800-854-0359

DATALEASE

700 No. Valley St., Ste. A, Anaheim, California 92801

(714) 533-3920

Telex 692439

THREE AND FOUR YEAR WALK-AWAY LEASES

1. ATTACHED PROCESSOR FOR 3158
2. 3158 - 3 MEG WITH APU FEATURE
SPRING AVAILABILITY
3. 3158 - 3 MEG MOD 3
SUMMER AVAILABILITY

THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle - (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman - (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Huntington Station, New York 11746

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115 370/125



ECONOCOM
1255 LYNNFIELD ROAD
P. O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

FOR SALE

IBM 1259 MICR Check
Reader Sorter
11 Pockets
Excellent Condition
Under Full
IBM Maintenance
Was Attached to an
IBM 360/50
Immediate Delivery
Call
ST. LOUIS COLLECT
(314) 644-4050
PAUL BOSWORTH

For Sale By Regional Information Systems

370-155J2

DAT, 4 Channels, Console and
1 Meg IBM Memory

AVAILABLE

JULY 1, 1978

Bid Accepted until May 30,
1978

Contact: A. Lee Gilbert

RISD

125 E. 8th Avenue

Eugene, OR 97401

(503) 687-4370

NEW MAG TAPE

\$9.50

100% CERTIFIED 2400'

Five Year Guarantee

Call Your TRI Distributor

LOCATION	PHONE
New England	617-749-5800
Washington, D.C.	703-938-5950
Ohio	216-226-1311
J.J. Data (II)	312-695-4040
T.M. Cptr (Chi)	312-485-8100
Pittsburgh	412-341-2001

TRI 312-428-4444

SERIES/1

PROGRAMMING

- BI-SYNC/ASYNCH/SDLC COMMUNICATIONS
- OEM DEVICE HANDLERS
- RPS SUPPORT
- COMPUTER INTERFACING
- ONLINE G/L AVAILABLE NOW
- COMPLETE BUSINESS SYSTEM UNDER DEVELOPMENT

APPLIED COMPUTER
SERVICES, INC.
12200 Sylvan St.
North Hollywood, Calif. 91606
(213) 980-1183



PDP 11/60 MASS STORAGE, MULTI-USER SYSTEM

FORMED COMPUTERS

Description

PDP 11/60 with MOS memory (battery back-up), Console Terminal, CRT Terminal, Double width cabinets, DH-11's with 32 async lines with modem control, dual 300 Mbyte drives, RK05 development drives, 300 LPM matrix Printer/Plotter, DEC RSX-11M with Fortran 4 plus full service software license.

Service

FORMED can provide complete installation including: site planning, installation of hardware/software systems.

FORMED provides complete pre-delivery checkout of critical system components.

FORMED account representatives are hardware/software scientists.

CALL TODAY FOR IMMEDIATE SERVICE
(213) 477-7534

AVAILABLE FOR OPERATING LEASE

12-3420-6's	incl. 6425, avail. 4-1-78
2-3803-2's	incl. 8100 & 1792, avail. 4-1-78

FOR SALE

1-3411-3	3221, 7360
1-3410-3	3221

WANTED TO PURCHASE

6-3420-3's	6631 or 3550 - ASAP
1-3803-1	3551 ASAP

CALL: (203) 324-9495

STAMFORD COMPUTER GROUP, INC.

927 Westover Road
Stamford, Connecticut 06902

FOR SALE BY OWNER IBM SYSTEM 3 MODEL 10

Available June 1, 1978
System under full
IBM maintenance

5410	Central Processor
32 KB	Main Memory
3741	Attachment
4100	MFCU Attachment
3972	5203-3 Printer
3901	Attachment
5444-2	5445 Disk Attachment 1st
5445-1	5445 Disk Attachment 2nd
5445-2	Paper Tape Attachment
841264	Printer 300 LPM 132 PP
	Multi-Function
	Card Unit
5203-3	Disk Store Drive
5424-A01	4.9M Bytes
5444-2	Disk Storage Drive
5445-1	20.48 M Bytes
5445-2	Disk Storage Drive
(3) 5496-1	20.48 M Bytes
	Data Recorder

PRINCIPALS ONLY CONTACT:
L.S. FORRESTER
(517) 676-3800

3033

(11/78, 2/79 Lease Only)

WANT TO BUY

3333-11's



**BARRETT
CAPITAL
& LEASING
CORPORATION**

14 Redwood Road
White Plains, N.Y. 10605
(914) 761-0070

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

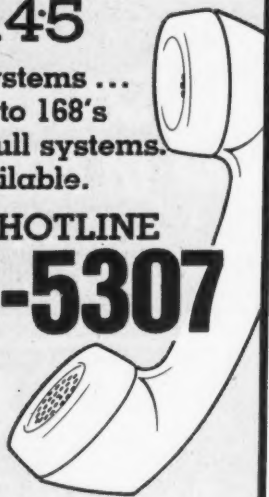
Short or Long Term Leases From

RANDOLPH

370/138
370/148
370/135
370/145

... and all other IBM systems ...
from S/3's and 115's ... to 168's
and all 303X. CPU's or full systems.
Up to 8-year leases available.

CALL THE 370 HOTLINE
800-243-5307



Randolph Computer Company
537 Steamboat Rd., Greenwich, CT 06830
(203) 661-4200

FOR SALE

- 1 HEWLETT-PACKARD 2000 ACCESS SYSTEM 128 Kb, 16 ports, I/O Ext., Paper tape, Console, 15Mb Disc, 1600 bpi Tape, 300 lpm Printer
- 2 Hazeltine Modular Ones
- 2 Centronics 530s
- 2 G.E. Terminus 30s
- 4 Vadic 3405G Modems
- 2 Vadic 307G Modems

CALL FRED DINER
(415)981-1880
HALEY TRAVEL

LIQUID COOLED MAIN FRAME USERS

We have a cooling unit for liquid cooled CPU's that operates up to 50% cheaper than other available units. Saves installation time and money. Does not take up space in computer room. Comes complete with 100% back-up system.

CONTROLLED ENVIRONMENT CORP.

640 Reynolds
Kansas City, KS 66101
(913) 342-3599

Over ten years experience in computer room environments. Ask about a heat recovery system for your EDP site. Could save you a small fortune in utilities.

BUY · SELL · TRADE

DATA MODULES
DISK PACKS
DISK CARTRIDGE
Attn: Gertie Mourar

USED COMPUTERS, INC.

7 Woodside Ave.
Berwyn, PA 19312
(215) 647-1881

For Sale or Lease

IBM 3741-3 Data Station (3)
3715-1 Printer (3)
3747 Data Converter

Univac 9300 32K
Burroughs 3500
Burroughs 1700

Norton Computer Corp.
10405 Town and Country Way
Suite 301
Houston, TX 77024
(713) 932-6564

FOR SALE OR LEASE

IBM 360/30's-32, 64 immediately
or 128K
IBM 2314-A1 1x4 4/24/78
(lease only)
IBM 3271-2 Controllers 30 Days
IBM 3277-2 Terminals 30 Days

Call Collect or Write

Berlent Industries, Inc.

1975 Hempstead Turnpike
East Meadow, N.Y. 11554
(516) 794-9722

Member
Computer Dealers
Association

The Logical Choice

BUYING SELLING
LEASING

360/30-40-50-65s
CPU — Peripherals
AND SYSTEM/3

3340 A02, B023303-1, 11 5410-A14
3830-2 3333-1, 11 3971
3420-4, 6, 8 3420, 3, 5 4100
3330-1, 11 3410's 6378
3420-3, 5, 7 1403's 5424-A1
3803-1,2 3420's 5203-2
2501's 5560
2401's 5444-2
5444-2

DATA AUTOMATION CO., INC.
4858 CASH ROAD
DALLAS, TEXAS 75247



AC 214 637-6570



compuductTM

158-A37

SALE/LEASE

AVAILABLE MAY 22, 1978

5650 Foremost Dr. SE, Grand Rapids, Mi. 49506
Phone: (616) 949-0281

★ 1419 ★

\$1600. Per Month

2821-6

Sale or Lease

-WANTED-

3344 • 3340 • 3330 • 3420
CPU'S-115, 125, 135, 145

Contact: Bernie Gest

215-635-1700

Computer

Marketing Inc.

7704 Seminole Ave.

Melrose Park, Pa.

19126



Member Computer Dealers Assoc.

dataserv

buy • sell • lease • trade

370
115/125/135
Steve Locny
800-328-2406

For Sale or Lease
Any 115/125 configuration
Sending 115/125
Back to IBM

Call us! We'll show
you how to make money
using your rental credits

370
138 THROUGH 158
Ron Olson
800-328-2406

For Sale or Lease
138 - 145 - 155
CPUs — Peripherals —
Want To Buy Now!
370/145-H2

7855
8810
6982
6983
3215 Console
3047 Power Units

370
Peripherals
800-328-2406
Tom Anderson

Available
3272-2 w/(2) 3250 Device Adaptors-May
15
3272 w/(7) 3250 Device Adaptors-May
15
3271-2 w/(4) 3250 Device Adaptors-
Now + 7821 (4800/7200 BPI)
3271-2 w/(6) 3250 Device Adaptors-
Now
3277-2 4630, 4631, or 4633 Keyboards.
Some with 6350 Light Pen-Now + 1090
Audible Alarm

360
CPUs and Peripherals
Neal Johnson
800-328-2406

For Sale or Lease
360/30 - 40 - 50 - 65s
CPU — Peripherals —
Memory

We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

Sys/3
CPUs and Peripherals
800-328-2406
SYS/32's

System/3-8,10,12,15
System 32/34

Special Sale on
Model 12's, System 3's

Call Toll Free 800-328-2406
or 612-544-0335

Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd
P.O. Box 9488, Minneapolis MN 55440

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340's

IBM UNIT RECORD EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557,

029-059-129

Call us for all your needs; we buy
rent and sell all types of IBM unit
record equipment. Over 12 years
of serving commercial and govern-
ment requirements. Contact ACS
for proposal.

7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910-881-1526

ACS
EQUIPMENT CORP.

HONEYWELL

2040
COMPLETE SYSTEM
FOR SALE
AVAILABLE NOW
CALL: D.NOSTHEIDE,
WASHINGTON, D.C.
202-223-3111

2 PDP 11's priced for quick sale

11/45 88K words, new 67 Meg Disk
9 track tape, 16 line async mux,
LA36, VT52
11/40 56K words, 2 RK05s, 9 track
tape, LP11

will accept best offer
will mix or match
617/661-6444

Cybertel
1 Dock Square
Boston, MA 02109

For Lease

3420-3's July 15
3420-6's June 1
3271 & CRT's Now
3031 2/79

For Sale

2065 June 15
6780 Blk Mpx June 15
1x6 Cal Comp As July 1
345

Computer Concepts, Inc.

6443 S.W. Beaverton Highway
Portland, Oregon 97221
503-297-4721

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

CHANCELLOR LEASING

Chancellor Corporation provides computer leasing and computer brokerage services throughout the United States.

Because of continued expansion of our major markets, Chancellor Corporation is expanding its branch office facilities. We have several outstanding career opportunities for individuals with an extensive background in the marketing of computers or peripherals.

If you live in Dallas/Ft. Worth, Houston or Atlanta and have an understanding of computer leasing, then Chancellor has an opportunity for you to join a leasing corporation in the fast growing computer leasing industry.

For an interview, please write to:

CHANCELLOR
CORPORATION

31 MILK STREET BOSTON MASSACHUSETTS 02109

165KJ 1451 138J 1351
SN 60103 SN 10873 SN 20021 SN 61154

April Availability

- CSA is the principle
- 12, 18, 24, 36-month leases acceptable
- Delivery & installation guaranteed under secured documentation
- Configured to your needs
- Peripherals available

* Professionalism *

Call Marv Berger (800) 225-2036 or
(617) 482-4671 in Massachusetts

**Computer Systems
of America, Inc.**

141 Milk Street, Boston,
MASSACHUSETTS 02109

**America's
Leading
Companies
Depend
on us.**

**Buying • Selling • Leasing
Sale & Leaseback**

3277 3803 3286
3272 3420 3284
3340 3330 3830

Call us on IBM Rental Credits. We pay your credits on
FTP, ETP and MAC equipment.

Contact: Bob Haggarty 203-438-9567

R. K. Enterprises, Inc. 470 Main St. Ridgefield, Ct 06877
Marketing Centers: New York, Dallas, Atlanta, Cincinnati, Los Angeles

303X

Leasing

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS

Bob Russell
Jack Emery
Dave Hepburn
Paul Baillie

SYSTEMS MARKETING, INC.
200 E. Thomas Road
Phoenix, Arizona 85012
(602) 244-5800 Telex: 667334

S/M

da

DEC

HARDWARE
PDP11-PDP8
LSI-11's
Processors Peripherals
Memories

VT52's LA36's
LS120's LA180's

Also available
Other printers and discs
available with controllers
for most minicomputers.

NATIONAL DATA
SALES CORP.
516/944-7444

FOR SALE

DEC Datasystem 340 Computer

With (3) RK05J, (2) VT05 CRT's,
300 lpm Printer and 48kb Memory with DIBOL

**C.D. Smith &
Associates, Inc.**

713-686-9405
730 N. Post Oak Rd.
Suite 301
Houston, TX 77024

168 AP

AVAILABLE AUGUST 1978

3033

AVAILABLE DECEMBER 1978

Dan Young

Federal Data Corporation

301-652-5766

SALE OR LEASE/PURCHASE

\$995/month — 24 months

Independent Communications Terminal Systems

IBM 360/20 SYSTEM CONFIGURATIONS			
Type	Model	Feature	Description
2020	BC4	2074	12K Central Processor Binary Synchronous Communications Adapter
		7496	Storage Control
		8085	2203 Attachment
		8100	2560 Attachment
2203	A02		Printer
		5558	24 Additional Print Positions
2560	A02		Multi-Function Card Machine
2311	012		Disk Drive
2311	012		Disk Drive

Refurbished eligible for Manufacturers M/A.

MCC

(214) 634-2750

TWX: 910-861-4171

METROPLEX COMPUTER COMPANY, INC.
7135 John Carpenter Freeway
P.O. Box 47220 Dallas, Texas 75247

Industry's Fastest Growing Computer Dealer



LEASING? WE'VE GOT YOUR 303X ON ORDER

...plus 135, 138, 145, 148, 158 & 168's too
(over \$130 million worth!)

- We'll write a short-term or long-term lease — on YOUR system or OURS
- We'll configure a total system or part of one to your specifications

"Our leasing concepts are sensitive to your needs"



**COMPUTER
CAPITAL
CORPORATION**

1351 WASHINGTON BLVD., STAMFORD CT. 06902
203-357-9663

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

SALE ALL IBM Unit Record Equipment
129 & 029's
East Coast
(717) 564-8870
West Coast
(415) 332-6265
Unit Record Leasing Company
110 HiVista Road
Sausalito, Calif. **LEASE**



INDEPENDENT

**WE BUY - SELL -
INSTALL & REPAIR**
AT REASONABLE PRICES

**HONEYWELL USED
SERIES 200 EQUIPMENT**
COMPUTER SYSTEMS
PARTS — PERIPHERALS

Now in stock

2040-64K M7-30K M9
120-1250 TAPE DRIVES
READERS PRINTERS PUNCHES
3200-131K Avail. 6/78

CALL NOW

Wilson Grabill (513) 874-8100

INTEGRITY SYSTEMS, INC.

4812 Interstate Drive
Cincinnati, Ohio 45246**FOR SALE**

3275-2 Display Stations
3286-3 Printers
3284-3 Printers
50-70 Available Now-November
3350 B2F Disk Storage
3 Available June 1
Call or Write

(714) 833-9800

TWX 910-595-2550

**SADDEBACK
MARKETING CORP.**



1401 Dove Street, Suite 245
Newport Beach, CA 92660

CONTINENTAL Information Systems

BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

AVAILABLE

168 KJ - 8 Channel - May

165 K - DAT available - April

158 J - 2 Megs OEM - May

158 AP - new, ITC qualifying - April

155 J2 - April

145 J2 - April

WE ALSO HAVE NEW, ITC QUALIFYING 168, 158, 148,
and 138 IN APRIL - MAY

Call Us!

Peripherals and I/O

All 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell
Wanted:

3330's, 3340's & 3420's



CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

CIS is very interested in
buying pre-owned
IBM 370 systems.
If you are thinking
about selling, let us
make you an offer.

**MINICOMPUTERS
& SYSTEMS**

Don't waste company time or
money. Check with us before you
buy or sell.

New DEC Equipment

Immediate Delivery

RK11-RK05 Disk Systems -
\$8500
PDP 11/04s and 11/34s - 20% off
list

DZ 11

DEC Station 78

New DG Equipment

Immediate Delivery

DG 10 Mbyte Disk Systems from
\$7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list

Immediate delivery for MOS!

Inventory Clearance

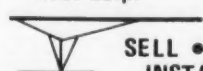
call us for free brochure

**MINICOMPUTER
EXCHANGE**

(408) 733-4400

TWX 910-339-9272

Nord Computer
Floor Corp.



**SELL • BUY
INSTALL**

COMPUTER FLOORS

Specializing in Lifting computers
on existing location

3 Warehouse Lane

Elmsford, NY 10523

(914) 592-2450-2451

(203) 248-7942

DEC

HARDWARE

PDP11-PDP8

Processors

Peripherals

Memories

VT52's LA36's**LS120's LA180's**

Also available

Other printers and discs
available with controllers
for most minicomputers.

NATIONAL DATA
SALES CORP.

516/944-7444

**BUYING, SELLING, LEASING
OR TRADING IBM EQUIPMENT?
THEN CALL US FIRST...**

**CSI COMPUTER
SALES INTERNATIONAL, INC.**

901 Office Park Plaza Oklahoma City Ok 73105 405-840-1911

Houston Tex

713-444-0246



St Louis Mo

314-727-7010

BUY • SELL

**TELETYPE
MODELS****43 • 33 • 32**

NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

BUY-SELL-SWAP**PDP 11'S & NOVA'S**

Systems and Peripherals at very
attractive prices
New and Used



Computer Equipment Sales

408-735 7360

PAUL PEREZ

408 735 7361

For Sale Or Lease

System 3/15

Complete Systems

- SHORT OR LONG TERM
- CONFIGURED TO YOUR NEEDS
- WITH OR WITHOUT PERIPHERALS

Any configuration from B19 to D24
30 to 90 days delivery
Also complete inventory tapes — disks.
Printers — CPU Upgrades

CDB FINANCIAL, INC.

3131 MAPLE AVE • 15B DALLAS, TEXAS 75201

214-745-1749

**BUY-SELL
TRADE**

For Computer
Call Action Write



P.O. Box 80572
404/458-4425 Atlanta, Ga. 30366

FOR SALE OR LEASE

IBM 360/30's-32, 64 Immediately
or 128K
IBM 2314-A1 1x4 4/24/78
(lease only)
IBM 3271-2 Controllers 30 Days
IBM 3277-2 Terminals 30 Days

Call Collect or Write

**Berlent
Industries, Inc.**



1975 Hempstead Turnpike
East Meadow, N.Y. 11554
(516) 794-9722

Member
Computer Dealers
Association**WANTED TO BUY****370/155 ANY CONFIGURATION****DAT ORDER POSITION FOR 155**

**COMPUTER
INSTALLATIONS
CORPORATION**

5514 Caroline Street
Houston, Texas 77004

713-524-8249

FOR SALE OR LEASE

Available Now

**370/155 MEMORY
2 1/2 MEGABYTES**


Please Contact:

Harry Blair

OR

Richard Johnson

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------



WANTED TO BUY
168, 158, 148, & 138's
165, 155, 145, & 135's.
All 370 peripherals,
CRT's & controllers.

FOR SALE OR LEASE

165K-II
4 megabytes with
DAT and channels.

158K
With ISC available
on 2 year lease

155J-II
up to 2 megabytes
with DAT.

145
Model 2 CPU, any
core size w/ or w/o ISC

135-I
Will sell or lease as
an H. Has full fea-
ture complement.

148/138
Several of these ma-
chines are now avail-
able from the origi-
nal users. They work
like new but cost sig-
nificantly less. Give
us a call!

65-I
up to 2 megabytes
and/or 6 channels..

50-I
Also have a 50-H.
Both have 3 chan-
nels.

3420-X
Most models readily
available with con-
trollers.

IPB Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

Surplus DEC And Data General Hardware For Sale

PHIL THOMAS (305) 272-8753

Thomas Business Systems, Inc.

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3 AND PERIPHERALS
WE BUY • SELL • LEASE • TRADE

transdata

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

PURCHASE/SALE/LEASE

ALL 360 & 370 SYSTEMS



CORPORATE COMPUTERS, INC. 3505, 3525 For Lease

115 Mason St., Greenwich, Conn. 06830 (203) 661-1500
Member Computer Dealers Association

Before you buy or sell used computer equipment consult

COMPUTER PRICE GUIDE

"The Blue Book of Used Computers"

Quarterly publication contains current price information about used IBM computers and peripherals. Includes newsletter about current price trends and availabilities.

\$5 per issue — \$18 annual subscription

Computer Merchants Inc.
75 South Greeley Avenue, Chappaqua, New York 10514
Member Computer Dealers Association (914) 238-9631

efm computer leasing, inc.

LEASE • BUY • SELL
360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40	360/65
360/50	370/135
	370/145

3000 marcus avenue
lake success, ny 11040
(516) 488-7876

DEC PDP-11/45 FOR SALE BY OWNER

Includes:

128 Kwords core memory
Cache Memory Buffer
FP-11
EIS
Memory Management
Real-time clock
LA-36 console & interface
Cabinet + H960-DA cabinet
Under DEC maintenance
Available June 1978

Contact:

Mr. R. Adams
Jackson Laboratory
Bar Harbor, ME 04609
(207) 288-3371 X226

REPOSSESSED EQUIPMENT FOR SALE

All Items in New And/Or Excellent Condition.

- (1) Calcomp T-80 Disc
- (1) MSC Disc Controller, TDC 802F-1
- (2) Keronix/Interdata Add-In Memory, 16K X 16
- (10) MCS/Midas 1 CRT VDU, W/10-Key Funct. Pad
- (2) Centronics 306C Printer
- (1) Centronics 306 Printer

Plus miscellaneous interfaces, cables, etc. Bids on all or part solicited on as is basis, FOB Newport Beach, CA, on or before June 1, 1978. Call or write for details:

MANUFACTURERS CAPITAL
4120 Birch, Suite 108
Newport Beach, CA 92660
(714) 833-8780



Know us by our mark

CDA, Computer Dealers Association, is an international nonprofit trade association dedicated to promoting the advantages of used computers. For a membership roster and copy of our code of ethics, write to: Mr. Marvin Lurie, Executive Director, Computer Dealers Association, 6650 Northwest Highway, Chicago, Illinois 60631 (312) 763-7350.

When you plan to buy or sell your computer equipment...

For complete information call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

U.S.	Home Office New York Chicago Dallas San Francisco	T. A. Takash Dick Ventola Pete Ahern M. W. "Bill" Tucker Henry Paulson	602-248-6037 914-949-1515 312-298-3910 214-233-1818 415-283-8980
INTERNATIONAL	Canada U.K./Europe Mexico Austro-Asia Eurasia	Don Maunder Joe Gold Andres Contreras John Hallmark Don Haworth	416-366-1513 022-61-27-54 905-543-6850 214-233-1818 214-233-1818
NON IBM	Dallas	John Hallmark	214-233-1818



GO GREYHOUND
Greyhound Computer Corporation
Greyhound Tower, Phoenix, Arizona 85077

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK!

FOR SALE

- 3135-H with 4655, 6981, 7861, 3215
Delivery 8/78
- 3145-HO with 512K Add-On CMI Memory
Delivery 5/78
- 3155-J with DAT Box—Delivery 7/78
- 3158-K—Delivery 6/78
- 3158-K—Delivery 8/78
- 3158-U34—Delivery 8/78
- 3031 Lease—Delivery 10/78

WANT TO BUY

- 3145-J2—Inst. 7/78
- 1442-N2
2821-1
- 3830-2
2880-2



3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO — 312/298-5650
WASHINGTON — 703/525-3074
LOS ANGELES — 213/370-4844

FOR SALE DEC Datasystem 340 Computer

With (3) RK05J, (2) VT05 CRT's, 300 lpm Printer and 48kb Memory with DIBOL

C.D. Smith & Associates, Inc.

713-686-9405
730 N. Post Oak Rd.
Suite 301
Houston, TX 77024

SALE or LEASE 360/25

... with 1403N1, 2540, tapes and disk if required. Call: Mike Seekings.

RANDOLPH COMPUTER CO.

800-243-5308
(In Conn: 203-661-4200)

VT52 DECscope \$1295

(Quantity one, cash with order)

For complete price list call or write:

ComManD, Inc.

7999 Knue Road, Suite 206
Indianapolis, IN 46250
(317) 842-3900

Buy Sell Lease

IBM Equipment

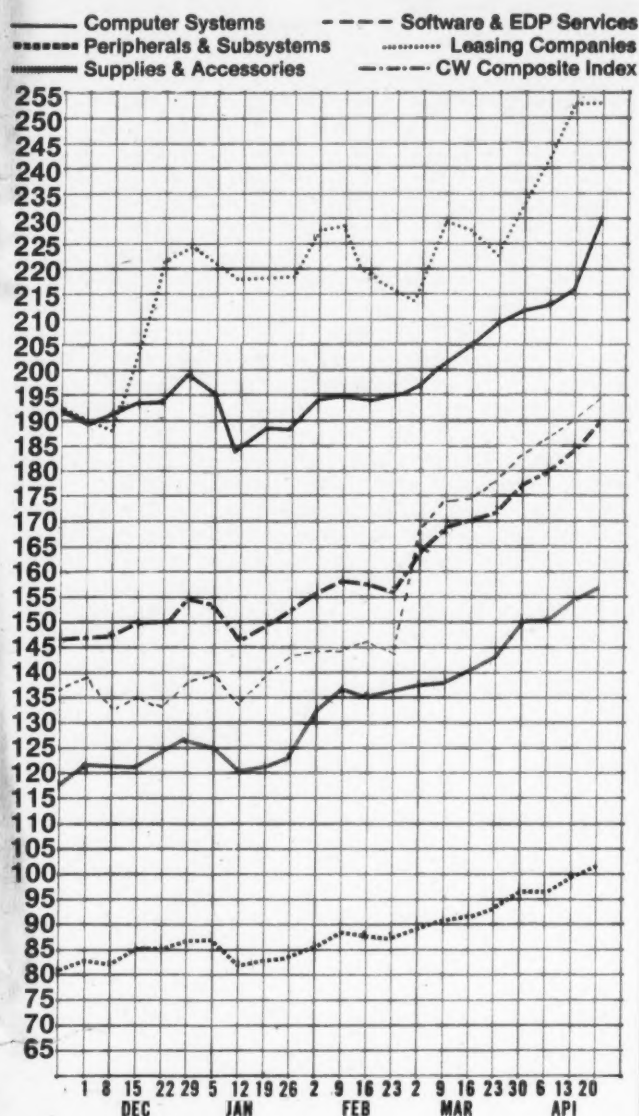
Please Call or Write

Kennsco

7232 BOONE AVE. NO. / MINNEAPOLIS, MN 55428
PHONE: 612/533-5800

buy sell swap		buy sell swap		software for sale		software for sale		software for sale																																																																										
IBM UNIT RECORD EQUIPMENT <table border="1"> <thead> <tr> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> <th>MACH</th> <th>SALE</th> <th>LEASE</th> </tr> </thead> <tbody> <tr> <td>024</td> <td>\$ 200</td> <td>\$20/Mo</td> <td>059</td> <td>\$1400</td> <td>\$50/Mo</td> <td>129</td> <td>\$3400</td> <td>\$110/Mo</td> </tr> <tr> <td>026</td> <td>\$ 800</td> <td>\$30/Mo</td> <td>082</td> <td>\$ 800</td> <td>\$30/Mo</td> <td>514</td> <td>\$ 800</td> <td>\$ 45/Mo</td> </tr> <tr> <td>029</td> <td>\$1800</td> <td>\$55/Mo</td> <td>083</td> <td>\$1700</td> <td>\$60/Mo</td> <td>519</td> <td>\$1000</td> <td>\$ 55/Mo</td> </tr> <tr> <td>046</td> <td>\$ 900</td> <td>\$40/Mo</td> <td>084</td> <td>\$2500</td> <td>\$90/Mo</td> <td>526</td> <td>\$1200</td> <td>\$ 50/Mo</td> </tr> <tr> <td>047</td> <td>\$1400</td> <td>\$60/Mo</td> <td>085</td> <td>\$1200</td> <td>\$60/Mo</td> <td>548</td> <td>\$1500</td> <td>\$ 60/Mo</td> </tr> <tr> <td>056</td> <td>\$ 200</td> <td>\$15/Mo</td> <td>088</td> <td>\$2500</td> <td>\$150/Mo</td> <td>557</td> <td>\$2900</td> <td>\$100/Mo</td> </tr> </tbody> </table> <p>Sale: 360/20 system: \$9500. WANTED TO BUY: IBM rental Credit 029-- and --129.</p> <p>THOMAS COMPUTER CORPORATION 600 N. McClurg Court - Suite 4202 Chicago, Illinois 60611 (312) 944-1401 Calif. Branch 115 Harbor Island Rd. Newport Beach, CA 92660 (714) 675-2810</p>					MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE	024	\$ 200	\$20/Mo	059	\$1400	\$50/Mo	129	\$3400	\$110/Mo	026	\$ 800	\$30/Mo	082	\$ 800	\$30/Mo	514	\$ 800	\$ 45/Mo	029	\$1800	\$55/Mo	083	\$1700	\$60/Mo	519	\$1000	\$ 55/Mo	046	\$ 900	\$40/Mo	084	\$2500	\$90/Mo	526	\$1200	\$ 50/Mo	047	\$1400	\$60/Mo	085	\$1200	\$60/Mo	548	\$1500	\$ 60/Mo	056	\$ 200	\$15/Mo	088	\$2500	\$150/Mo	557	\$2900	\$100/Mo	BASIC SOFTWARE AT BASIC PRICES License Fee one fifty Payroll \$750 \$1000 Accounts Payable 600 800 Accounts Receivable 600 800 General Ledger 750 1000 ALL FOUR \$2400 \$3200 Inventory/Billing/ Sales Analysis \$1200 \$1600 ONE YEAR GUARANTEE Specify Data General Ext. BASIC or DEC BASIC <i>General Computer Corp.</i> Candler Building GCC Atlanta, Georgia 30303 (404) 522-6596					ACCOUNTS PAYABLE DEC RSTS/E Is it possible to design, code, checkout and install a RSTS/E Accounts Payable System in 10 man-days? Probably not! It may take 10 or even 20 times longer For less than the amount generally associated with 10 man-days of effort, you can purchase an Accounts Payable System from JEDARK. \$2,995.00 End-user License includes BASIC-PLUS source code and documentation. JEKARK Corporation P.O. Box 143 Haworth, N.J. 07641 (201) 387-7388					PAYROLL PERSONNEL SUPER/PAY ONLY \$960 ANS COBOL 60+ USERS Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase Easy to Use 30 Day Trial Occidental Computer Systems 10202 Riverside Drive No. Hollywood, Calif. 91602 (213) 763-5144				
MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE																																																																										
024	\$ 200	\$20/Mo	059	\$1400	\$50/Mo	129	\$3400	\$110/Mo																																																																										
026	\$ 800	\$30/Mo	082	\$ 800	\$30/Mo	514	\$ 800	\$ 45/Mo																																																																										
029	\$1800	\$55/Mo	083	\$1700	\$60/Mo	519	\$1000	\$ 55/Mo																																																																										
046	\$ 900	\$40/Mo	084	\$2500	\$90/Mo	526	\$1200	\$ 50/Mo																																																																										
047	\$1400	\$60/Mo	085	\$1200	\$60/Mo	548	\$1500	\$ 60/Mo																																																																										
056	\$ 200	\$15/Mo	088	\$2500	\$150/Mo	557	\$2900	\$100/Mo																																																																										
Want To Buy IBM 5100 APL Configured With Sykes-Comm-Stor 5100 Contact Art Byrne (201) 825-3311 Center for Communication Management Inc.					FOR LEASE 370/158-2 megabytes system with/ISC 370/168-4 megabytes system with/ISC Contact T.J. McArdle National Computer Rental, LTD N.Y.C., NY (212) 532-1500					HP-1000 With Image 1000 A. Contractors Package Complete Job Cost Info/Control systems (gross & net std basis). + Payroll + Union, MUR/CPR reports. B. Plant Maint & Fleet Operations Daily Equip Scheduling, Oil & Maint Service Systems-9 service levels. C. General Ledger, A/R, A/P and Financial Statements. In Fortran/BASIC - can be easily converted to HP-3000 & other Minis. M.S.A. Inc. (317) 297-2090 Box A-24337 Indianapolis, IN 46224					RPG TO COBOL Dataware's software translator converts RPG and PPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code. • RPG/RPG II to PL/I • PL/I to COBOL • EASYCODER/TRAN to COBOL • BAL/ALC to COBOL • AUTOCODER (7070) to COBOL • COBOL to COBOL • AUTOCODER/SPS to COBOL For more information on our translators, write or call today. Dataware, Inc. 495 Delaware Street Tonawanda, N.Y. 14150 (716) 695-1412																																																																			
FOR SALE OR LEASE 370/135 MODEL GDO 3215-3046 CALL: (617) 272-8258					FOR SALE IBM 1060 Teller Terminals and IBM 2980 Teller Terminals with 2972-8 Controllers Available May 1, 1978 For further information call: Mr. John Maher (212) 584-6000 Ext. 332					HP 264X SCREEN FORMATTING MADE EASY COMPLETE SOFTWARE & METHOD FOR • Layout • Documentation • Generation • Editing COMPUTER SYSTEMS CONSULTANTS 825 W. TIPTON • (602) 624-3106 TUCSON, AZ. 85705					TP PROBLEMS? • TSO RJE CICS • TCAM BTAM HASP • 3270 2780 TTY Our LINE ACTIVITY RECORDER software package helps diagnose Access Method, TCU, and Terminal Protocol problems. (MVT, VS/1, VS/2, IBM 270X compatible TCUs.) Communications Diagnostic Systems, Inc. • P.O. Box 706 Falls Church, Virginia 22046 (703) 533-0483																																																																			
NOTICE OF SALE Douglas County, Nebraska, Purchasing Department will receive sealed bids 5-16-78 on the sale of the following equipment: One (1) S/360, Model 40, 384K; One (1) 2501 Card Reader; Two (2) 2314 Storage Control; Two (2) 2313 Disk Storage; Three (3) 2319 Disk Storage. For further information and a copy of bid specifications contact William Cuff, Purchasing Agent, Douglas County, 1819 Farnam St., Omaha, NE 68102. (402) 444-7158.					FOR SALE 370/125 192K FEATURES <table border="1"> <tbody> <tr> <td>4101</td> <td>4102</td> <td>4505</td> </tr> <tr> <td>4662</td> <td>4667</td> <td>4668</td> </tr> <tr> <td>4670</td> <td>4675</td> <td>5248</td> </tr> </tbody> </table> *Plus All N/C Features No Brokers Please P.O. BOX 601 STAMFORD, CT. 06904					4101	4102	4505	4662	4667	4668	4670	4675	5248	For Sale PDP11-RSX11M Inquiry Retrieval Access System IRAS is a software product which provides a generalized capabilities for: • Screen Formatting • File Maintenance • Inquiry • Data Retrieval The product is written for PDP11s under RSX11M, V2 and V3. SPRIDELLIS & ASSOC., INC., 14 W. 40th St., New York, N.Y. 10018, (212) 221-7270.					IF COST IS THE PROBLEM, OUR SOFTWARE IS THE ANSWER. We've got the software you need. Now. PAYROLL/PERSONNEL ACCOUNTS PAYABLE TAXBREAK/TAXCOST (Payroll Tax Calculation Modules) Call us. (415) 845-7991  argonaut Information Systems, Inc. 2140 Shattuck Ave. Berkeley, CA 94704																																																										
4101	4102	4505																																																																																
4662	4667	4668																																																																																
4670	4675	5248																																																																																
370-135 FOR SALE • 512K • IFA-3330/3340 • ICA • IPA • Two selector channels • Etc. Available July 1 Computer Properties Inc. 5200 W. 73rd Street Minneapolis, MN (612) 831-6088					Micro APL SOFTWARE, APPLICATION PACKAGES, custom programming, and computers are available now! We buy, sell, lease and support IBM 5100's and 5110's. Gary Tremblay Alta Consultants Box 848 Huntington Beach, California 92647. (714) 847-3755. TRS80 Users Group Monthly Newsletter. Join Now! \$17.00 First Year. \$12.00 thereafter. Marsh, 621 13th South, Onalaska, WI 54650.					 TONE TSO for VSI Redesigned to eliminate TCAM and the staggering overhead of user swapping  System to System Communication for VSI InterSystem Spool Processor Two unique products from TONE Software Corp. (write or phone for details) TONE Software Corp. (714) 636-8501 11588 Trask Avenue Garden Grove, Ca 92643																																																																								
BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS C.D. SMITH 730 N. Post Oak Road #301 Houston, Texas 77024 (713) 686-9405					Real Estate OFFICE SPACE AVAILABLE at the Sturbridge Office Center in historic Sturbridge, Mass. This modern office space - with electric heat - central air conditioning - free parking - is... IDEAL FOR YOUR BRANCH OFFICE, SALES OR DISTRIBUTION CENTER. This location easily serves the nearby areas of Springfield-Hartford-Worcester and Providence. Write for information to Sturbridge Office Center Sturbridge, MA 01566 or phone (617) 347-3450					CONVERTING?  Try the experts. DASD Corporation encourages test evaluations of all of our language translators. RPG/RPG II to COBOL (DOS or OS) will accept all types of RPG and produce ANS COBOL. Most translations are 100% error free. Our modular COBOL simplifies maintainability. SYSTEM/3 COBOL to OS COBOL makes this tedious, redundant conversion completely automatic. We're 97% clean, which frees a lot of man hours for more important tasks. DOS COBOL to OS COBOL is basically a difference of syntax, but may mean a lot of wasted man hours. GE MAP to OS COBOL will allow immediate upgrade of your GE 400 series to full ANS COBOL. 360/20 BAL to 360/370 OS ALC is an extremely solid product eliminating a monotonous programming job. DASD TRANSLATORS SAVE TIME AND MONEY. Many service options are available: lease, conversion only, conversion and clean compile; full conversion responsibility including testing and JCL. For a prompt solution to your conversion problems, write or call today. DASD CORPORATION National Marketing 1480 Renaissance Drive—Suite 315 Park Ridge, Illinois 60068 312/299-5005 																																																																								

software for sale	software for sale	time & services	time & services	time & services
<h2>Blue Chip Software</h2> <p>Lots of blue chip companies use our software systems for one simple reason: blue chip performance. May we tell you more?</p> <p>MCCORMACK & DODGE CORPORATION 381 Elliot Street, Newton Upper Falls, MA 02164, (617) 964-6610</p> <p>Please send me more information on the system(s) I have checked.</p> <p> <input type="checkbox"/> General Ledger <input type="checkbox"/> Purchasing <input type="checkbox"/> Fixed Assets Analysis <input type="checkbox"/> Construction in Progress <input type="checkbox"/> Accounts Payable </p> <p> Name _____ Title _____ Company _____ Computer _____ Address _____ City _____ State _____ Zip _____ Tel. No. _____ </p>		<h2>TIME & SERVICES</h2>		
<h3>DON'T WRITE COBOL</h3> <p>GENERATE it with MAXI/COBOL, the unique multi-purpose macro-oriented precompiler for OS-OS/VS COBOL. You can:</p> <ul style="list-style-type: none"> • Create structured programs more easily • Enhance maintainability • Use shorthand symbols • Use our existing macros • Write your own macros • Save time - Save money <p>Attractive terms. 30-day free trial. Contact programming shops welcome.</p> <p>Cornell Software 174 Bellair Road Ridgewood, NJ 07450 (201) 444-0085</p>		<h3>COMPUTER TIME</h3> <p>Timeshare-Dial Up Batch Prime 400's</p> <ul style="list-style-type: none"> • Excellent Rates • Convenient Northern N.J./NYC Location • Complete systems and software support • Fortran-Cobol-Basic • Prime time and off hours • Complete data security including safe storage • Consulting services available <p>For Information Call: Carl Dula (201) 335-7800</p> <p>isa R. SHRIVER ASSOCIATES 120 Littleton Road Parsippany, New Jersey 07054</p>		
<h3>RPG II SYSTEMS</h3> <ul style="list-style-type: none"> *A/R-OPEN ITEM OR B/F *ACCOUNTS PAYABLE *GENERAL LEDGER *PAYROLL AND LABOR DIST. *INVENTORY *CREDIT UNION MAILING, ETC <p>Extensive Documentation Provided Bancroft Computer Systems P.O. Box 1533, Dept. C West Monroe, LA. 71291 (318) 388-2236</p>		<h3>COMPUTER TIME</h3> <p>SYS-3 MOD 15</p> <p>42K, 2-33 Disk Drives, 1 Tape Drive, 2501 Rdr 1403 Prntr, 2560 MFCM</p> <p>Available 9-12 AM</p> <p>Mr Porazzo (212) 344-7700</p>		
<h3>HOW TO STAY #1</h3> <p>Florida Software Services didn't become the leader in the financial software field by hiring second rate people. We like winners. We like creative thinkers. And, we take care of them — with top salaries, the best benefits and a great Central Florida location.</p> <p>Our business is providing application packages and data services for over 1000 banks worldwide. In addition, we operate seven computer centers serving the health care industry. Our rapid growth rate keeps us constantly on the lookout for sharp people in: Operations • Sales • Technical Writing • Product Marketing • Systems Analysis.</p> <p>If you have the qualifications and the desire to be with the leader, let's get together. Send a resume in strictest confidence to our Personnel Director.</p> <p>FLORIDA SOFTWARE SERVICES INC. P.O. Box 2269, Orlando, Florida 32802 The standard in financial software programs.</p>		<h3>TIME TO LEASE</h3> <p>IBM 360/30 64K 4 TAPE & 3 Disk Drives Calcomp Plotter-1401 Compatibility if desired.</p> <p>Henderson and Bodwell Consulting Engineers 120 Express St. Plainview, N.Y. 11803 (516) 935-8870</p>		
<h3>Core Memory Repair</h3> <p>Ampex, Burroughs, CAI, CMI, Data Craft, Data General, CDC, DEC, EMM, Fabri Tek, Honeywell, GAI, HP, Interdata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XDS.</p> <p>Any Manufacturer's Memory</p> <p>THREE DELTA CORP 1038 Kiel Ct. Sunnyvale, CA 94086 (408) 734-2680</p>		<h3>REMOTE JOB ENTRY</h3> <p>PHOENIX-HECHT</p> <ul style="list-style-type: none"> • IBM 370/158-3 • Nationwide incoming Watslines • Complete systems and software support • Full application Library (including all accounting applications) • All high-level languages • Prime time and off hours • VS 2 HASP INTERCOMM. ROSCOE • Complete data security including off-site storage <p>For information call John MacDougall at (312) 861-7100</p> <p>PHOENIX-HECHT 233 N. Michigan Avenue Chicago, Illinois 60601</p>		
<h3>I.B.M. 360-40</h3> <p>All Shifts 128K, 4-2401 MOD-2, 9-2314, 1403-N1, 2540, 1401 Compatibility.</p> <p>From \$35/Hour</p> <p>Restaurant Associates, Inc. 1540 Broadway New York, N.Y. 10036</p> <p>Contact: Al Paimo (212) 997-1413 Charles Leigey (212) 997-1411</p>		<h3>Need Computer Time?</h3> <p>Time is available now on a 370/145 1 MEG, 3340 Disks, 3420 Tapes, Reader, 1403N1 Printer, Punch. DOS/VS & Power/VS. RJE capability. 1401 compatibility. Payroll package. Programming support available. Unit Record equipment. Convenient New Jersey Location.</p> <p>Contact: Bill Vincent 201-654-3230 for more details</p>		
<h3>I.B.M. 360-40</h3> <p>196K, 6-2401 MOD 5, 8-2314, 1-1403-N1 1-2540, 1401 Compatibility</p> <p>The American Plan Corp. 100 Crossways Park W. Woodbury, NY 11797 Contact: John Reeves (516) 364-2700</p>		<h3>370/158 mod 3 Datacenter</h3> <p>3.5 meg MVS Specializing in Remote Job Entry TSO, CICS, and Batch IBM 3800 Laser Printer Very Attractive Rates Contact: Stu Kerievsky (212) 564-3030</p> <p>Datamor 132 West 31 St. New York, N.Y. 10001</p>		
<h3>CHICAGO 370 - 145</h3> <p>DOS/VS - GRASP TIME/SERVICE Computyme of Chicago (Loop) (312) 922-6624</p>		<h3>SPECIALISTS KEYPUNCHING KEY-TO-DISC</h3> <ul style="list-style-type: none"> *Metro N.Y. Service Leader *Two Locations, Multi-shifts *All Applications *Top Quality Assurance *24 Hour Turn-a-round *Free Pick-up & Delivery <p>WE CAN SAVE YOU DOLLARS!</p> <p>Ask Kurt Schmidt for details (201) 751-7070 COMMERCIAL COMPUTER SERVICES, INC.</p>		
<h3>TEXT DATA BASE BUILDING</h3> <p>Fantastic Rates! Fantastic Service!</p> <p>ComCom inputs fifty million characters per week with a maximum error rate of one in 20,000 characters—double-keyed and electronically proofread.</p> <p>Rates begin at \$1.25/M characters.</p> <p>Specialty—converting, updating and CRT typesetting existing data bases.</p> <p>Interested? Contact Mr. David Zellner ComCom, Inc. 834 N. 12th St.-Box 2 Allentown, Pa. 18102 215-437-9656</p>		<h3>BROKERS OF COMPUTER TIME</h3> <p>New York & New Jersey Only Computer Reserves, Inc. (212) 687-1840 (201) 676-1881</p>		
<h3>DEC SYSTEM 10/20</h3> <p>Time Sharing... Low Cost...</p> <p>Fortran IV Cobol Basic + 2</p> <p>Call Stan Koy (312) 644-5650</p> <p>PRYOR CORPORATION Computer Services and Supplies 400 North Michigan Avenue Chicago, Illinois 60611</p>		<h3>WE ARE BROKERS OF COMPUTER TIME</h3> <p>New York & New Jersey Only Computer Reserves, Inc. (212) 687-1840 (201) 676-1881</p>		



Earnings Reports

ADVANCED MICRO DEVICES
Year Ended March 26

	1978	1977
Shr Ernd	\$1.77	\$1.64
Revenue	92,331,000	62,116,000
Earnings	5,037,000	4,474,000
3 Mo Shr	.60	.48
Revenue	27,588,000	17,549,000
Earnings	1,849,000	1,299,000

BURROUGHS

	1978	1977
Shr Ernd	\$.82	\$.70
Revenue	504,985,000	442,604,000
Earnings	33,487,000	28,389,000

COMPLICORE

	1977	1976
Shr Ernd	\$.23	.....
Revenue	2,329,000	\$4,469,000
Tax Cred	94,000	.....
Spec Cred	.....	a1,294,000
Earnings	223,000	(2,174,000)

a-Gain on forgiveness of bankruptcy debt.

COMPUSCAN

	1978	1977
Shr Ernd	.....	\$ .17
Revenue	\$2,968,000	3,682,000
Earnings	(56,000)	383,000
9 Mo Shr	.....	.43
Revenue	7,469,000	10,560,000
Earnings	(950,000)	937,000

COMPUTER PRODUCTS

	1978	1977
Shr Ernd	\$.13	a\$.09
Revenue	2,552,723	1,893,269
Earnings	227,080	159,824

a-Adjusted for a 20% stock dividend paid in November 1977.

DATA RESOURCES

	1978	1977
Shr Ernd	\$.51	\$.37
Revenue	7,073,100	5,504,400
Earnings	691,900	502,400

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Frank Collins
Account Managers
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
District Manager
Peter Senft
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Judy Milford
Account Managers
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
353 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J242461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Tele.: UK-264737

West Germany
Hans-Jürgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKED

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 19, 1978

All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

E X C H	PRICE					E X C H	PRICE					E X C H	PRICE				
	1977-78 RANGE (1)	CLOSE APR 19 1978	WEEK NET CHNGE	WEEK PCT CHNGE			1977-78 RANGE (1)	CLOSE APR 19 1978	WEEK NET CHNGE	WEEK PCT CHNGE			1977-78 RANGE (1)	CLOSE APR 19 1978	WEEK NET CHNGE	WEEK PCT CHNGE	
COMPUTER SYSTEMS																	
A	22-55	50 1/8	+4 1/8	+8.9		O	ADVANCED COMP TECH	0-2	1	0	0.0	O	DATA ACCESS SYSTEMS	4-5	4 3/4	+1 1/4	+5.5
N	55-91	66 3/4	+7	+11.7		O	ANACOMP INC	7-12	11	+1 1/8	+11.3	O	DATA 100	6-14	13 7/8	+2 1/4	+19.3
C	18-30	25 3/4	+3 3/8	+1.4		A	APPLIED DATA RES.	5-12	11 5/8	+1 1/8	+10.7	O	DATA PRODUCTS CORP	9-19	16 3/4	+7 3/8	+5.5
N	20-29	27 7/8	+3 3/4	+2.7		N	AUTOMATIC DATA PRUC	23-30	28 7/8	+2 1/8	+7.9	O	DATA TECHNOLOGY	3-4	4 1/4	+1 1/4	+6.2
C	15-40	39 1/2	+4 1/4	+12.0		O	CLEMAN AMERICAN COS	1-2	1 3/8	0	0.0	O	DATUM INC	1-4	3 7/8	+1 1/8	+3.3
N	35-54	49 5/8	+3 1/4	+7.0		O	COMPU-SERV NETWORK	8-15	8	-1 1/2	-5.8	O	DECISION DATA COMPUT	2-3	1 5/8	-1 1/8	-7.1
N	18-47	46 7/8	+3 7/8	+9.0		C	COMP ELECTION SYSTEMS	6-10	9	-1 1/8	-1.3	O	DELTA DATA SYSTEMS	1-1	1 1/4	0	0.0
N	37-53	41 5/8	+2 3/4	+7.0		C	COMPUTER HORIZONS	1-2	2 1/4	0	0.0	A	DOCUMENTATION INC	6-13	13 1/8	+5 3/8	+5.0
N	2-5	5	+1	+25.0		O	COMPUTER NETWORK	6-11	9 1/8	+3 3/8	+4.2	O	DATARAM CORP	2-24	17	0	0.0
A	8-16	15 7/8	+1 1/2	+3.2		O	COMPUTER SCIENCES	7-11	10 7/8	+7 3/8	+8.7	N	ELECTRONIC M & M	4-6	5	-1 1/8	-2.4
O	13-26	25 1/2	+1	+4.0		C	COMPUTER TASK GROUP	1-2	2	0	0.0	O	FABRI-TEK	1-2	7/8	-	-6.2
O	28-54	34	+1	+3.0		O	COMPUTER USAGE	1-3	3 5/8	+1 1/4	+10.5	O	GENERAL COMPUTER SYS	0-2	1 1/4	0	0.0
C	6-10	9 3/8	+3 3/8	+4.1		C	COMSHARE	5-11	10 1/4	-1 1/2	-4.6	N	HAZELTINE CORP	8-15	12 3/4	+1 1/8	+0.9
C	1-1	1 1/8	0	0.0		O	DATA DIMENSIONS INC	3-5	4 1/4	-1 1/4	-5.5	N	HARRIS CORP	28-49	49	+1 3/4	+3.7
N	62-87	72	+7 3/8	+11.4		O	DATAIAB	1-2	1 1/4	0	0.0	O	INFOREX INC	4-8	7 3/8	+1 1/4	+3.5
A	43-55	49 1/2	+4 1/4	+9.3		N	ELECTRONIC DATA SYS.	14-20	18 1/4	+3 3/4	+4.2	O	INFORMATION INTL INC	8-14	9 1/2	-1 1/2	-5.0
N	236-286	253	+16 3/4	+7.0		C	INSYTE CORP	2-3	1 1/2	0	0.0	O	INTEL CORP	38-57	48 1/2	+4	+8.9
O	5-14	13 3/4	-1 1/4	-1.7		C	IPS COMPUTER MARKET	1-2	2 1/4	0	0.0	A	LUNDY ELECTRONICS	3-6	4	0	0.0
O	7-18	11	+7 3/8	+8.6		O	KEANE ASSOCIATES	3-4	3 1/4	-1 1/8	-3.7	O	MSI DATA CORP	6-15	13 3/4	+1 3/8	+11.1
O	5-12	6	+1 1/4	+4.3		O	KEYDATA CORP	1-3	2 1/2	+3 3/8	+17.6	N	MEMOREX	23-39	38 7/8	+3 7/8	+11.0
C	5-13	11 3/4	-1 1/4	-2.0		A	LOGICON	7-17	12 7/8	-1 1/2	-3.7	N	MOHAWK DATA SCI	5-9	9	+3 3/8	+4.3
N	32-49	48 5/8	+4 1/4	+9.5		A	MANAGEMENT DATA	1-2	1 1/8	+1 1/8	+12.5	O	PERIL CORP	2-8	7 1/4	-3 3/4	-9.3
C	12-33	32 1/2	+1 7/8	+6.1		A	NATIONAL CSS INC	10-19	18 3/4	+1 1/2	+2.7	N	PERTEC CORP	7-12	11 5/8	+3 3/8	+3.3
N	17-22	18 1/2	+1	+5.7		O	NATIONAL DATA CORP	4-9	9	+1 1/8	+1.4	A	POTTER INSTRUMENT	2-2	2 1/4	0	0.0
N	16-40	40 3/8	+2 3/4	+7.3		A	ON LINE SYSTEMS INC	16-24	22 1/4	-5 1/8	-2.7	O	PRECISION INST.	2-2	2	0	0.0
N	33-42	38	+2 3/8	+6.6		N	PLANNING RESEARCH	3-6	5	0	0.0	O	QUANTOR CORP	3-5	3	+1 1/8	+4.3
O	8-22	21 3/4	+3 3/8	+1.7		C	PROGRAMMING & SYS	1-1	5/8	-1 1/8	-16.6	O	RECOGNITION EQUIP	0-10	10 7/8	+1 1/8	+1.6
A	5-14	13 5/8	+1 3/8	+11.2		O	REPIDATA INC	2-4	4 1/8	+1 1/4	+6.4	O	SCAN DATA	1-2	2 1/4	+3 3/8	+23.3
A	10-17	16 3/8	+3 3/4	+4.7		C	REYNOLDS & REYNOLD	17-25	23 3/4	+1 1/4	+5.5	O	STORAGE TECHNOLOGY	10-33	32 3/4	+5 3/8	+19.6
						C	SCIENTIFIC COMPUTERS	1-4	4 1/2	+1 1/2	+12.5	O	T BAR INC	7-19	17	-2 1/4	-11.6
						O	TYMSHARE INC	14-23	21 3/4	+7 3/8	+4.1	O	TALLY CORP.	4-9	8 1/4	-3 3/8	-4.3
						A	URS SYSTEMS	4-6	5 7/8	0	0.0	A	TEC INC	6-10	7 5/8	+5 3/8	+8.9
						N	WVLY CORP	1-5	4 3/8	-5 1/8	-12.5	N	TEKTRONIX INC	29-40	38 3/4	+2 1/2	+6.8
												N	TELEX	2-5	4 5/8	+1 1/4	+5.7
												O	TESDATA SYSTEMS CP	13-20	15	-3 3/4	-4.7
												O	WILTEK INC	1-1	1 1/2	0	0.0
PERIPHERALS & SUBSYSTEMS																	
N	10-20	18 7/8	+3 3/8	+2.0		N	ADDRESSOGRAPH-MULT	10-20	18 7/8	+3 3/8	+2.0						
O	7-11	11	+7 3/8	+8.6		O	ADVANCED MEMORY SYS	7-11	11	+7 3/8	+8.6						
N	8-13	13 1/4	+1 1/4	+1.9		N	AMPEX CORP	8-13	13 1/4	+1 1/4	+1.9						
C	3-6	5 1/2	-1 1/4	-4.3		C	ANDERSON JACOBSON	3-6	5 1/2	-1 1/4	-4.3						
N	10-20	14 1/4	-1 1/4	-1.7		N	APPLIED DIG DATA SYS	10-20	14 1/4	-1 1/4	-1.7						
O	5-12	5 1/2	+1 1/8	+2.3		O	BEEHIVE INT'L	5-12	5 1/2	+1 1/8	+2.3						
A	6-9	7	-3 3/4	-9.6		A	BOLT, BERANEK & NEW	6-9	7	-3 3/4	-9.6						
N	8-14	14	+1 1/4	+1.8		N	BURKEL-RAND	8-14	14	+1 1/4	+1.8						
A	3-6	5 1/2	+1 1/2	+10.0		A	CALCOMP	3-6	5 1/2	+1 1/2	+10.0						
C	1-4	3 3/8	-3 3/8	-1.9		C	CAMBRIDGE MEMORIES	1-4	3 3/8	-3 3/8	-1.9						
N	16-30	19 1/8	+3 3/8	+1.9		N	CINTRONICS DATA COMP	16-30	19 1/8	+3 3/8	+1.9						
C	1-1	1 3/4	+0	0.0		C	COMPUTER COMMUN.	1-1	1 3/4	+0	0.0						
O	5-8	9 3/4	+3 3/4	+8.3		O	COMPUTER CONSOLES	5-8	9 3/4	+3 3/4	+8.3						
A	4-7	5 3/4	-1 1/4	-4.1		A	COMPUTER EQUIPMENT	4-7	5 3/4	-1 1/4	-4.1						
C	2-4	4 1/8	+1 1/8	+3.1		C	COMPUTER TRANSCIVER	2-4	4 1/8	+1 1/8	+3.1						
O	1-1	1 3/8	-1 1/8	-8.3		O	COMPUTER TRANSCIVER	1-1	1 3/8	-1 1/8	-8.3						
C	9-16	15 7/8	+1 3/4	+12.3		C	COWEN	9-16	15 7/8	+1 3/4	+12.3						
N	19-28	21 5/8	+1 1/4	+6.1		N	COSPAC CORP	19-28	21 5/8	+1 1/4	+6.1						
SUPPLIES & ACCESSORIES																	
A	6-9	8 1/2	+1 1/8	+1.4		A	AMERICAN BUS PRODS	6-9	8 1/2	+1 1/8	+1.4						
O	1-4	3	+7 3/8	+4.3		O	BALTIMORE BUS FORMS	1-4	3	+7 3/8	+4.3						
A	10-20	19 7/8	+1 1/8	+4.6		A	BARRY WRIGHT	10-20	19 7/8	+1 1/8	+4.6						
O	1-1	7/8	0	0.0		O	CYBERMATICS INC	1-1	7/8	0	0.0						
O	14-21	20 3/8	-5 1/8	-2.9		O	DUPLEX PRODUCTS INC	14-21	20 3/8	-5 1/8	-2.9						
N	6-12	11 1/2	+1 1/8	+1.0		N	ENNIS BUS. FORMS	6-12	11 1/2	+1 1/8	+1.0						
N	43-56	46 3/4	+2 1/4	+5.0		N	3M COMPANY	43-56	46 3/4	+2 1/4	+5.0						
C	24-37	29	-1 1/4	-0.8		C	MOORE CORP LTD	24-37	29	-1 1/4	-0.8						
N	16-28	27 5/8	+3 1/2	+14.5		N	NASHUA CORP	16-28	27 5/8	+3 1/2	+14.5						
O	18-25	22 1/4	-1 1/2	-2.1		O	STANDARD REGISTER	18-25	22 1/4	-1 1/2	-2.1						
O	8-19	9 1/4	-1 1/8	-1.3		O	TAB PRODUCTS CO	8-19	9 1/4	-1 1/8	-1.3						
N	18-24	23 7/8	-1 1/8	-0.5		N	UACRO	18-24	23 7/8	-1 1/8	-0.5						
A	10-15	12 3/4	+1 1/8	+0.9		A	WABASH MAGNETICS	10-15	12 3/4	+1 1/8	+0.9						
N	17-23	22 7/8	+1 3/8	+6.3		N	WALLACE BUS FORMS	17-23	22 7/8	+1 3/8	+6.3						

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-DEL-WASH
 L=NATIONAL; M=LOWEST; G=OVER-THE-COUNTER
 C-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
 (1) TO NEAREST DOLLAR

The BIG Story in Super-Mini Computer Systems:

"HAZELTINE 1500 SERIES" SELECTED BY MODCOMP FOR "CLASSIC."

Hazeltine 1500 A new definition in conversational terminals that includes most features usually found only in higher-priced terminals.

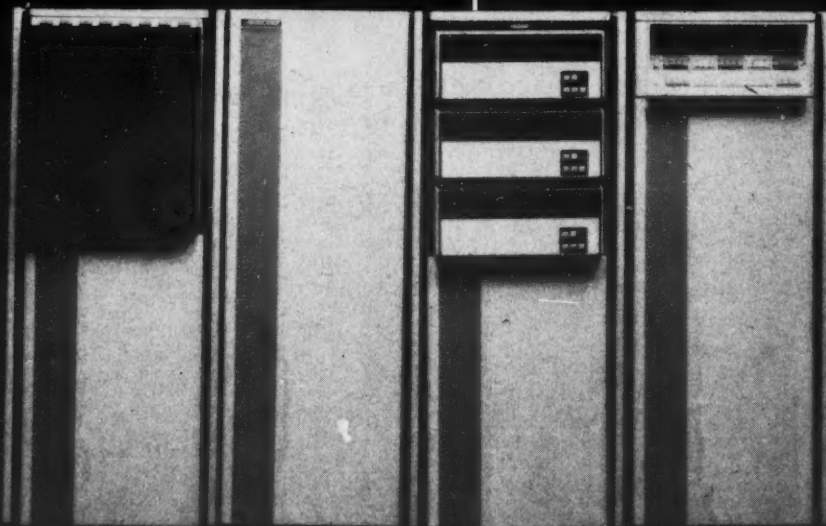
Hazeltine 1510 A buffered editing terminal with extended system flexibility and capabilities.

Hazeltine 1520 A Multi-Processor System Terminal. A Breakthrough in Printer Control.

Hazeltine Puts Performance
Into Economy Terminals.



Hazeltine Corporation
Computer Terminal Equipment
Greenlawn, New York 11740
(516) 549-8800 Telex 96-1435



EAST: N.Y. (212) 586-1970 □ MIDWEST: Chicago (312) 986-1414
SOUTH: Atlanta (404) 434-8444 □ WEST: Burlingame (S.F.) (415) 342-6070
ENGLAND: Hazeltine Ltd. 01-948-3111 Telex (851) 928572
GERMANY: Hazeltine GmbH 0611-590748 Telex (841) 416924
FOR WORLDWIDE SALES INFORMATION CALL: (516) 549-8800.